

Low Income Housing Tax Credits: Before and After the 2008 Financial Crisis

by

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I. Abstract

The goal of “Low Income Housing Tax Credits: Before and After the 2008 Financial Crisis” was to understand the changes that impacted this highly significant, but hidden market. The main focus of the analysis is on the geographical changes of LIHTC properties over the course of the financial crisis. To analyze this, the paper uses two main techniques; visual analysis along with empirical data analysis.

The results of both these techniques are quite interesting as they show the interplay between the LIHTC market and the Community Reinvestment Act (CRA) and the transformation that takes place over the course of the crisis. You can visually see properties clustering around population dense areas, which correlates with existing predictions made by industry experts. This data is backed up with a visual analysis of CRA regional tracts that were innovatively calculated using the commercial branches of the top 20 US Banks as a proxy. An empirical data analysis also revealed demographic trends that were set in motion by the financial crisis, and can have a larger impact on the goal of affordable housing. Overall, the paper has presented a detailed analysis on the LIHTC industry in a period that can have long term repercussions on the future success of the program.

II. Acknowledgements

I would like to thank Professor Adam Brandenburger for supporting me in this venture to understand an industry that I knew nothing about. It was a pleasure to be able to pursue a topic without being pressurized for answers.

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III. Introduction

The popular belief is that most for-profit corporations are solely interested in advancing their bottom line and have no regard for the greater good of society. Ignoring the veracity of that statement, there are many tools that corporations use to display their social generosity, including the widely touted Corporate Social Responsibility initiative. Such initiatives are mostly charitable acts where the firm balances trading-off money for enhancing the firm's public image. However, there are other means available to large corporations, especially banks, that can simultaneously enhance the firm's profits while also providing benefits for the larger society. This double bottom line subsection is where Low Income Housing Tax Credits (LIHTCs) enter, as they help corporations offset their tax burden while using their equity investments to build affordable housing. By doing so, corporations are able to use these investments as trade-ons, where they increase their bottom line while doing social good.

The LIHTC program was established as a part of the Tax Reform Act of 1986, and it essentially provides tax incentives to corporate and individual investors to invest in the development, acquisition and rehabilitation of affordable housing.¹ This entire program is financed through Federal tax subsidies, however it is implemented on a State level. Investors can claim tax credits annually over a 10-year period, calculated as a percentage of costs incurred in developing the affordable housing property, on their Federal tax returns. Since the creation of the program in 1986, LIHTC's have helped finance more than 2.4 million affordable rental housing units for low income households, and have continually been regarded as a success at both the State and Federal level.

¹ Black, David, and Sherrie Rhine. 2014. *Low-Income Housing Tax Credits: Affordable Housing Investment Opportunities for Banks*. Washington: Office of the Comptroller of the Currency.

The 2008 Financial Crisis however, disrupted an otherwise very successful venture. The credit market meltdown caused severe problems to the LIHTC market as large national banks such as Fannie Mae and Freddie Mac became unprofitable. These losses made the already acquired tax credits essentially worthless, and caused the demand and thus the price of LIHTC's to plunge.² As a part of the American Recovery and Reinvestment Act, the government implemented two programs to prevent a complete collapse in the LIHTC market. Both the Tax Credit Assistance Program (TCAP) and the Tax Credit Exchange Program (Exchange) were created to act as a stopgap for projects and to "offset the drop in tax credit demand and pricing".³

As the US economy recovered post 2010, the LIHTC market recovered as well. However, the disrupted landscape has led to a very different LIHTC program, both in terms of the market and the individual properties. The overall goal of my paper is to compare the LIHTC program prior to 2008 with what it is today. To do so, this paper will first aim to understand the success of the LIHTC program prior to 2008 using certain KPI's and determine the factors that were integral to that success. It shall then analyze the impact of the Financial Crisis based on these KPI's and delve deeper into the trends that resulted from the crisis. The paper will then aim to compare these two periods using visual and modeled data analysis and present its conclusions.

² Joint Center for Housing Studies of Harvard University. 2009. *The Disruption of the Low-Income Housing Tax Credit Program: Causes, Consequences, Responses, and Proposed Correctives*. Cambridge: What Work's Collaborative.

³ IBID

IV. Basis of Success for the LIHTC Program

The success of the LIHTC program can essentially be broken into three factors, targeted implementation, risk distribution and program longevity. All three of these aspects are heavily dependent on the structural implementation of the overall system. Considering the program is required to provide affordable housing across the nation, it is impressive to witness the efficiency with which resources are allocated. The key to this success lies in integration of the Federal and State governments in the process.

Distribution of Capital

The Internal Revenue Service (IRS) allocates tax credits to state housing credit agencies (HCA's) based on each state's population.⁴ This structure allows HCAs to use their state specific knowledge of housing problems to directly apply the credits most efficiently. While this seems like a very minor step in a relatively complex process, the impact of this system cannot be stressed enough, as it allows quick and accurate distribution of capital across the nation. The second stage of the LIHTC allocation process is equally significant as tax credits are specifically distributed to projects and then later bought by corporations.

Instead of HCA's creating affordable housing projects themselves, they instead follow a bottom up approach that requires project developers to apply for tax credits. This provides an even more targeted methodology as project developers have the most current information and use tax credits as incentives to bring equity capital from investors. To qualify for tax credits, these proposed projects must set aside "at least 40 percent of the units for rents earning no more than 60 percent of the area's median income (40/60 test) or 20 percent of the units for renters

⁴ Black, David, and Sherrie Rhine. 2014. *Low-Income Housing Tax Credits: Affordable Housing Investment Opportunities for Banks*. Washington: Office of the Comptroller of the Currency.

earning 50 percent or less of the area's median income (20/50 test)."⁵ These units are also subjected to numerous other rent controlling requirements to insure that they actually provide benefits for the intended population.

Once the tax credits are allocated to the specific project, the project developers sell the project's equity (usually 99.9%) to the investors who are able to benefit from the tax credits and other related incentives. With the access to private equity, the equity sale also brings in the skillset and efficiency of the private sector.

Risk Diversification and Efficient Oversight

While the LIHTC market is open to investments from individuals and corporations alike, the complexity of the transactions as well as the longevity of the payoffs (10 years) makes the system favor institutional investors. Large institutions such as banks have the ability to forecast their profits (and taxes) decades into the future and are in primary position to take advantage of tax credits. Banks also have deep knowledge of the real estate markets and are able to leverage that information to insure maximum returns with minimum costs. The LIHTC market also provides institutions with an opportunity to diversify their investments as it gives them access to a unique asset class.

The LIHTC program also works in conjunction with other government financial plans to create a web of incentives that attract private investment. The Community Reinvestment Act (CRA) is one such incentive, as it encourages banks to reinvest in distressed neighborhoods in which "it accepts monetary deposits"⁶. They are obligated under the CRA to "make loans,

⁵ Black, David, and Sherrie Rhine. 2014. *Low-Income Housing Tax Credits: Affordable Housing Investment Opportunities for Banks*. Washington: Office of the Comptroller of the Currency.

⁶ CohnReznick. 2012. "The Community Reinvestment Act and Its Effect on Housing Tax Credit Pricing." Analysis, Boston.

provide services and make investments in low to moderate income neighborhoods”⁷ in which they conduct business. Since the majority of such investment opportunities are unattractive due to their higher risk and lower return profiles, the LIHTC program stands out. Banks prefer to invest in LIHTC properties located within their CRA footprint to achieve their CRA test objectives. In fact, this demand for LIHTC properties is reflected in the equity pricing spreads for properties located within CRA regions vs ones that are not. According to some reports, at the extreme end, the spread can be as large as 35 cents on the dollar. All of these factors lead to the current scenario pictured in Figure 1, where it is clear that institutional investors are the dominant force.

Multi-investor (owned by a fund syndicated to more than one corporate investor) and Proprietary (owned by a fund syndicated to one corporate investor) investment vehicles dominate the market with over 80% of investments.⁸ The scale of these investments is also considerably larger than those done by individual investors, as multi-investor investments receive an average of 2.9 Million USD in housing credits while public investments receive only 622,000 USD. With such large investment sizes, institutions are very careful when screening properties before development and use their experience to assess the financing and forecasting of the market.⁹

Apart from the expertise that investors bring, they also shoulder the burden of a project failing. The largest risk associated with LIHTC investments lies in the construction and lease-up stages of the project. Instead of the Federal or State governments having to insure that a project is constructed on time and leased out to maximum capacity, it is instead borne by the project

⁷ CohnReznick. 2012. "The Community Reinvestment Act and Its Effect on Housing Tax Credit Pricing." Analysis, Boston.

⁸ Ernst & Young. 2010. *Understanding the Dynamics V*. New York: Ernst & Young.

⁹ Novogradac & Company. 2011. *Low-Income Housing Tax Credit: Assessment of Program Performance & Comparison to Other Federal Affordable Rental Housing Subsidies*. New York: Novogradac & Company.

developer. Similarly, in the case of property conversion, where the property goes into “foreclosure because of the sizing of the permanent loan, the federal government does not lose any money”¹⁰. In essence, external investors are able to insulate the government from all extraneous risk factors while simultaneously ensuring that the project is completed in the most effective manner.

Program Longevity

The timeline for projects is similarly very important, as the IRS requires a 15-year compliance period in which tax credits might get recaptured. This long time horizon forces investors to closely oversee their LIHTC investments. As earlier discussed, the major investors in the LIHTC market are large banks and corporations, which makes the tax recovery process relatively straightforward. Unlike other programs, where recovery is a long, drawn out process with numerous small developers, the LIHTC system is efficient from beginning to end.

The influx of private capital combined with institution-like management, really separates the LIHTC market system from that of other public based programs.¹¹

¹⁰ Novogradac & Company. 2011. *Low-Income Housing Tax Credit: Assessment of Program Performance & Comparison to Other Federal Affordable Rental Housing Subsidies*. New York: Novogradac & Company.

¹¹ IBID

V. Success Prior to 2008

The inherent structure of the LIHTC program has yielded an impressive set of statistics since the program's inception. To make the comparison between the LIHTC market before and after the crisis easier, it is best to break down the areas of analysis into two divisions, property performance and investment performance. Both divisions provide different perspectives of LIHTCs as it shows how the properties themselves were performing and how investors were faring in the market.

Property Performance

Perhaps one of the most significant aspects of the LIHTC property market has been the stabilization of the individual projects. In fact, in the 4 years prior to the 2007/2008 Financial Crisis, LIHTC properties were on the up and up. The best indicator for this is the property occupancy rates that were consistently in the 96-97.5 % range. The hard debt coverage ratio, which is the “measure of cash flow available to pay debt obligations”¹², has similarly remained very high and has ranged between 1.12 and 1.16 over the past 4 years. In 2006, the debt coverage ratio fell slightly to 1.14 however this is above historical averages. Both these metrics are in line with industry underwriting terms that require 93%-95% occupancy and 1.15 hard debt coverage.¹³

The cash flow that each unit in a property brings is also a significant measure of financial health and interestingly, follows the path taken by the median debt coverage ratios. In the years 2004 and 2005, the hard debt coverage was at its highest point since 1993 before it came back down in 2006. The median cash flow per unit is at its highest point ever in 2004 and 2005, before

¹² Investopedia. n.d. *Debt-Service Coverage Ratio (DSCR)*. Accessed May 2, 2016. <http://www.investopedia.com/terms/d/dscr.asp>.

¹³ Ernst & Young. 2010. *Understanding the Dynamics V*. New York: Ernst & Young.

falling down dramatically to \$246 per unit from almost \$400 per unit in 2005.¹⁴ While the \$246 is still a very healthy figure and is consistent with historical trends and property expectations, it is interesting to see how both these measures were at an all-time high in the two years prior to the financial crisis, and started trending considerably downwards in 2006. This could represent either of two things, firstly the increase in 2004 and 2005 could be inherent market bubbles that were leading to higher cash flows and over demand for housing, or that those two years were simple anomalies that had superior earlier performance. Unfortunately, there is insufficient information to take this aspect of the analysis further as properties do not have the data distribution to make a complete deduction.

One area of analysis that is consistent, is the lack of underperforming properties. In 2006, the percentage of properties that were below 90% occupancy and below 1.0 hard debt coverage ratio was 16.4% and 35.1% respectively. Properties with negative cash flows were at 34.7%.¹⁵ While occupancy rates are significant, it seems to me that the hard debt coverage ratios and cash flows show a much deeper perspective when it comes to property and market performance. Even properties with lower debt coverage ratios and negative cash flows have high occupancy rates due to the intrinsic demand for affordable housing. In regular, market rate properties, growth in a state's economy results in an increase in demand for housing and therefore, an increase in rental prices.¹⁶ Following this argument, one would assume that LIHTC properties would be inversely related to state GDP growth rates as affordable housing inhabitants would move to regular homes as their disposable income increases. This does not actually end up being the case for LIHTC's as despite the outflow of residents from LIHTC properties, the backlog of demand insures that

¹⁴ Ernst & Young. 2010. *Understanding the Dynamics V*. New York: Ernst & Young.

¹⁵ IBID

¹⁶ CohnReznick. 2012. "The Community Reinvestment Act and Its Effect on Housing Tax Credit Pricing." Analysis, Boston.

high occupancy remains. An R squared value of 3% as seen in **Figure 2** below, shows that the correlation between state GDP growth rates and median cash flow per unit for their requisite LIHTC properties is essentially negligible.

Even in the underperforming LIHTC properties, the extent of underperformance is quite low. Of the 35.1% of properties below the 1.0 hard debt coverage ratio, 45% were in the 0.8 to 1.0 range. Similarly, of the 16.4% of properties that were below the 90% occupancy rate, 50% were in the 85-90 % range.¹⁷ This low magnitude of underperformance is further depicted by the lack of chronic underperformance, as the percentage of properties that underperformed in consecutive years was at 16.4% and 27.2% for occupancy rates and hard debt coverage ratios respectively. All these factors contribute to an excessively low foreclosure rate at 0.85% as compared to other asset classes.

Investment Performance

Although property performance is significant, it isn't closely related to macroeconomic trends, hence it is difficult to see the impact of the financial crisis. The investment performance of LIHTCs themselves is highly dependent on the external forces of the market, as if investors are not willing or able to buy LIHTCs, it is reflected in the price. Instead of looking at prices directly, I decided to use housing tax credit fund yields. Looking at Figure 3, fund yields have essentially been on a downward trend all the way till 2008 where there is a sharp uptick. However, since 1991 LIHTC's have consistently provided better yields than similar products such as 10 year treasuries and blended municipal bonds. Of course, the yield for LIHTC is calculated on an effective yield basis as a function of the buyer being able to reduce his tax credit by that specific amount. This chart quite clearly shows the uniqueness of LIHTC investments as

¹⁷ Ernst & Young. 2010. *Understanding the Dynamics V*. New York: Ernst & Young.

it provides an above market rate of return while simultaneously providing social benefits. While it is hard to quantify the exact social gain from LIHTC investments, under the criterion of additionality used to validate impact, it is clear that LIHTCs “increase the quantity or quality of the social outcome beyond what otherwise would have occurred”.¹⁸

The Crisis Years 2007-2009 and Recovery

The crisis years effected the properties and the LIHTC market. The hard debt coverage ratio fell to 1.09-1.11 and cash flows were down to \$149 – \$158 per property.¹⁹ However, occupancy rates essentially stayed the same, dropping slightly to 95%. This shows the significance of Figure 1, where state growth rates are uncorrelated with property occupancy rates. While properties themselves were mostly unchanged, the LIHTC market was reeling from a collapse in demand. LIHTC prices fell from an all-time high of \$1.10 in 2006 to less than \$0.80 in 2009²⁰. Correspondingly, the yields for these investments went up from an all-time low of 5% in 2006 to over 10.5% in 2009/2010. Demand from big banks and Freddie Mac and Fannie Mae was considerably down, and it was impacting the entire market.

The US government intervened by introducing Section 1602 LIHTC exchange program as a part of the Recovery Act in 2009. The program “appropriated funding to the credit allocating agencies to be used as grants to finance the construction of, or acquisition and rehabilitation of, qualified low income building for low income housing in lieu of LIHTC”²¹. Each state was given

¹⁸ Brest, Paul, and Kelly Born. 2013. "When Can Impact Investing Create Real Impact?" *Stanford Social Innovation Review*, Fall: 8.

¹⁹ Enterprise Community Asset Management, Inc. 2014. *Asset Management LIHTC Portfolio Trend Analysis*. Columbia: Enterprise.

²⁰ CohnReznick. 2012. *The Low Income Housing Tax Credit Program at Year 25: an Expanded Look at Its Performance*. Boston: CohnReznick.

²¹ Joint Center for Housing Studies of Harvard University. 2009. *The Disruption of the Low-Income Housing Tax Credit Program: Causes, Consequences, Responses, and Proposed Correctives*. Cambridge: What Work's Collaborative.

its unused 2007 and 2008 LIHTC allocations and 40% of its 2009 LIHTC allocation. The goal of this program was not to prop up the LIHTC investor market but instead to finance the stalled properties. Due to the structure of the LIHTC system, numerous properties had received their LIHTC allocation but had not sold them to investors yet. The corresponding fall in the market made the tax credits undesirable and the Exchange program's aim was to ensure that these properties were completed. This Exchange program however, essentially disrupted the entire private sector role in the LIHTC system as the government took the role of the investor. Despite the many calls to increase the length of this program, the government used this as a onetime measure to protect existing properties.

The Department of Treasury used the Tax Credit Assistance Program (TCAP) to similarly boost funding for upcoming projects, knowing that it would take the market a few years to bring back private investors. The focus of these funds was to give priority to projects that are expected to be completed by February 2012.²² While it is difficult to know how exactly these two programs fared, there are many experts that believe these stopgap measures have reduced the distribution of LIHTC properties across the US. The argument is that the Exchange program is actually preventing the return of private capital as allocating agencies are actually exchanging their credits instead of accepting lower market prices. Since investor bids are being turned down, they are dropping out of the market. Markets in CRA dense areas are very competitive, thus they are impacted less, yet regions where banks are not dense are highly impacted.²³

²² U.S. Department for Housing and Urban Development. n.d. *Tax Credit Assistance Program*. Accessed May 5, 2016. <http://portal.hud.gov/hudportal/HUD?src=/recovery/programs/tax>.

²³ Joint Center for Housing Studies of Harvard University. 2009. *The Disruption of the Low-Income Housing Tax Credit Program: Causes, Consequences, Responses, and Proposed Correctives*. Cambridge: What Work's Collaborative.

VI. Geographical Trend Analysis

I thought this aspect was quite interesting, so I decided to investigate the geographical distribution of housing projects further. The first step that I took was to simply map out the locations of all the LIHTC properties across the US by their zip code as seen in Figure 4 - 28. I wasn't expecting to see anything specific, however there were a few trends that I could visually see. The first trend was that LIHTC properties were scattered across the US from the inception of the program in 1987 to the late 1990's. You then start to see a slow movement of properties towards the East coast, and specifically to more urban areas. This process of clustering visibly accelerates in 2007, where you start seeing clear hotspots around major metropolises. The second trend is the sheer drop in properties in those financial crisis years. To actually analyze the drop in crises, I simply did a calculation of all the projects that were allotted LIHTC funding on a yearly basis. Looking at Figure 29, it is clear that the number of projects starts to drop around 2007, in line with the financial crisis.

While this information is interesting in itself, it does not adequately show that properties were moving towards more urban areas. So I decided to overlay the properties with the number of housing units across the US by color as can be seen in Figure 30 – 41. The color green and red represented high and low density of housing units respectively. As can be seen, the two insights seen above were still consistent. The properties were clustering, and clustering was taking place in high population density areas of the United States. The number of properties in non-dense areas was decreasing around 2007, whereas prior to that there was more geographic diversification. Yet there were some data complications that somewhat skew the information. The software that I was using did not allow me to overlay different years of housing information and it only used the housing data available in 2016. As result, when looking at the properties in

2000, the background coloring of housing density is comparing the property distribution to the population almost 16 years in the future. Since the US population is growing between 1% and 0.8% ²⁴ yearly, this can have a considerably large impact on the data analysis. To analyze similar information in a fairer manner, I took another analytical route.

I used the property zip code as the dominating factor and connected that with the population within each zip code. By doing so, I was able to use the size of the bubbles to represent the size of the population within each region. Essentially, the larger the bubble the larger the population of that specific region. You can visually see that the larger bubbles were located together, and moving closer around the financial crisis years. Comparing the yearly differences in population again poses a data analysis problem. Since censuses are not done on a yearly basis, you again face a population scale problem. However, yearly population growth rates are available. So I made the assumption that the aggregate growth rate for the country was the same as the growth rate for that in each zip code and I discounted the population using the yearly growth rates. While this is obviously not probable, since I was looking at the entire country and the scale of analysis was quite large, I believe that the aggregate growth rates of all the zip codes should not be too far off from the growth rate of the country. Regardless of these complications, the population data showed some interesting results even though the analysis stays relatively close to the narrative around CRA investment and the drive to secure CRA consideration by banks.

²⁴ Multpl. 2016. *US Population Growth Rate by Year*. Accessed May 8, 2016. <http://www.multpl.com/us-population-growth-rate/table/by-year>.

Demographic Trends

I wanted to take this further however and I wanted to map the information with demographic data. While there were no specific hints about the influence of demographics in LIHTC property selection, I wanted to see if there were in fact any trends that connected these aspects together. The first step I took was to continue a visual analysis and I overlaid the demographic data on top of the LIHTC properties. I started with the African American population, and visually, I was not able to see any real changes in the data. While it does seem as if there is a higher clustering of properties in African American dense regions (colored red in Figure 40 - 52), to visually see the change is somewhat difficult. So I decided to take a mathematical approach.

In a similar procedure to what I used with the population analysis, I mapped the zip code of all the LIHTC properties with the respective percentage of African Americans in that zip code. On its own, this information would not show much as it essentially compares data from different zip codes. Instead, I decided to compare the percentage of African Americans in the zip code, with the average percentage of African Americans in the US. Using this method, I got a binary variable where the zip code was either higher or lower than the average percentage of African Americans. I then calculated the total percentage of all LIHTC properties in a given year that were higher than the average. To make the comparison more equal, I did the same analysis for Caucasians and Asians. Unfortunately, I did not have the data for the Hispanic population for each zip code, which would have essentially completed the major population demographics of the US. As can be seen in Figure 53, there are interesting trends that take place in the scope of my analysis (2000 – 2012).

Between the years 2000 and 2008, the percentage of properties in which there were more African Americans in the zip code than the average in the country was at 38%. This essentially meant that LIHTC properties were located in areas where there was a higher proportion of African Americans than average. What is more interesting, is to see the variation of this change as compared to Caucasians, especially after the 2008 financial crisis. In fact, at 43%, 2008 represents the largest number of properties that were located in higher than average African American zip codes. Yet, in the four following years, this number considerably drops from 43% in 2008 to under 31% in 2012, representing an almost 30% drop. Correspondingly, the percentage of above average white neighborhoods with LIHTC properties increases from 40% to over 56% in the same period with a 39% increase. This is quite significant data as it shows a major trend of properties moving from more African American neighborhoods to more Caucasian neighborhoods. However, instead of jumping into a racial profiling discussion, I believe that this could very much be centered around my prior analysis of properties clustering around cities.

In fact, according to Census Scope, the population identifying as “both black or African American and non-Hispanic” is concentrated largely in “southern states”²⁵. Looking back at Figure 4-28, we can see from the maps that there is a clear movement in properties from these southern states around the financial crisis. As the LIHTC properties are moving away from southern state locations and more towards urban cities in the North and North East of the US, the demographics of the properties are changing as well. It again comes down to CRA investment skewing LIHTC properties towards major urban areas around banking hubs.

²⁵ CensusScope. n.d. *African-American Population*. Accessed May 9, 2016. http://www.censusscope.org/us/map_nhblack.html.

CRA Regions Pulling LIHTC Properties

The problem of the CRA system is that it is extremely complex and it is almost impossible to calculate the exact CRA region for each bank without more resources. As a result, I had to come up with another method that could relatively score the CRA regions. Since the CRA program requires banks to “make loans, provide services and make investments in low to moderate income neighborhoods”²⁶, the first two factors are essentially centered around the consumer banking branches of these banks. The third factor, investments, are made by the bank’s national headquarters, which gives it a higher CRA weight and requires more investment (essentially buying more LIHTCs). Hence, by mapping out the branches of the 20 largest US banks by deposits (Figure 54) using FDIC publically available data, I could see where the CRA regions would lie. To get to that stage however, I had to make certain assumptions and decisions.

I first correlated the branches of the 20 largest US banks with their zip codes and regions. After compiling the list of bank branches, I realized that there were lots of zip codes that only had a few branches in them (1-3). In fact, there were 1271 zip codes that had over 3 branches in it, and so I removed all the data of zip codes with less than three branches from my analysis. Doing so, I was able to focus on the areas of the country that were real hubs of financial institutions as they would correspondingly attract more LIHTC investments due to CRA consideration requirements. This clearly showed that there were clear regions with a heavy dominance of branches. Out of the top 10 zip codes with the most branches in them, 5 are in New York City of which 4 are in the top 5. Since the branches were acting as a working proxy for CRA regions, I compared this information with the LIHTC property. As expected from all the analysis done previously, there was a clear convergence towards these highly financially

²⁶ CohnReznick. 2012. "The Community Reinvestment Act and Its Effect on Housing Tax Credit Pricing." Analysis, Boston.

dense hubs, showing that the LIHTC investment was following CRA consideration, especially after the financial crisis.

VII. Findings

Through a combination of visual and mathematical data analytics, I was able to analyze the geographical trends of LIHTC properties and their changes due to the financial crisis. There are three main findings to take away. The first is that properties started clustering post 2007/2008 and started moving to higher population dense urban areas. Secondly, the demographics of the properties changed as well, moving from above average African American to above average White around the same period. Third, the trend of properties clustering and moving towards urban areas correlates with CRA consideration regions.

VIII. Next Steps

Due to the resources available to me, there are certain areas of the analysis that I would like to improve upon in the future. The first area is that I would like to have more yearly data for housing in the US as this would allow me to compare the interaction between LIHTC properties and housing density better. I would also like to use data for the Hispanic population as that will show me the trends that lead up to the demographic changes.

Moving away from data, I would also like to add a more robust mathematical model to quantify the changes taking place during the movement of LIHTC properties. While the visual analysis is interesting and it provides a useful starting point, a mathematical model will add more weight of proof. I was attempting to utilize a range radius method to calculate the clustering changes however I was unable to do so in the time constraints. Despite this, I believe that the research has yielded interesting results and it has set the base for more analysis down the line.

IX. Conclusion and Implications

I started this thesis to better understand the changes that occurred in the LIHTC market during the financial crisis. However, during my research, I found that there were very interesting factors taking place in the geographical trends of the LIHTC properties. One of the main reasons that LIHTC program has been successful is due to the integral role played by private investors. The mutually beneficial relationship between the government and the private sector has led to a very efficient and successful relationship for both parties. Despite this, the 2008 financial crisis and its stopgap solutions have caused a significant change in the LIHTC program. The focus on urban centers can have larger implications for US affordable housing. Yes, having funding for affordable housing is key, yet a program that clearly favors individuals living in metropolises is certainly not the best case scenario. The LIHTC program that we see in the 1900's and early 2000's, while still skewed to urban areas, is considerably more distributed than the post crisis program.

The reasons for this change are quite complex, and it may just be a temporary issue that will revert itself in the next few years. One potential explanation for the change in can simply be that funds are still inefficient to meet the needs of states with low demand. Even the TCAP and Exchange program funding were not sufficient to cover the financing gap. Another explanation could lie in the reduced roles of Freddie Mac and Fannie Mae post crisis. According to some experts, these two organizations have “no appetite for new tax credits” given the magnitude of their losses. In fact, “it was widely reported during the fall of 2009 that both GSEs were actively seeking a sale of credits, but the Treasury failed to approve a proposed sales contract of \$2.6

Billion”.²⁷ The LIHTC market has essentially never had to function without the GSEs involvement and it is a completely different market without them. Experts are unsure whether the market can bounce back without these organizations especially considering the fact that even CRA motivated banks have a lower need to buy tax credits due to their ability to use losses during the crisis to offset taxes. All in all, it poses a murky and somewhat bleak picture about the future of the LIHTC program. Yet, the foundations are strong and it represents a rare system that allows both the private sector and public sector to benefit while also providing real social gain for society.

²⁷ Joint Center for Housing Studies of Harvard University. 2009. *The Disruption of the Low-Income Housing Tax Credit Program: Causes, Consequences, Responses, and Proposed Correctives*. Cambridge: What Work's Collaborative.

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<http://portal.hud.gov/hudportal/HUD?src=/recovery/programs/tax>.

XI. Appendix:

Figure 1

Distribution of Investments by Investment Vehicle

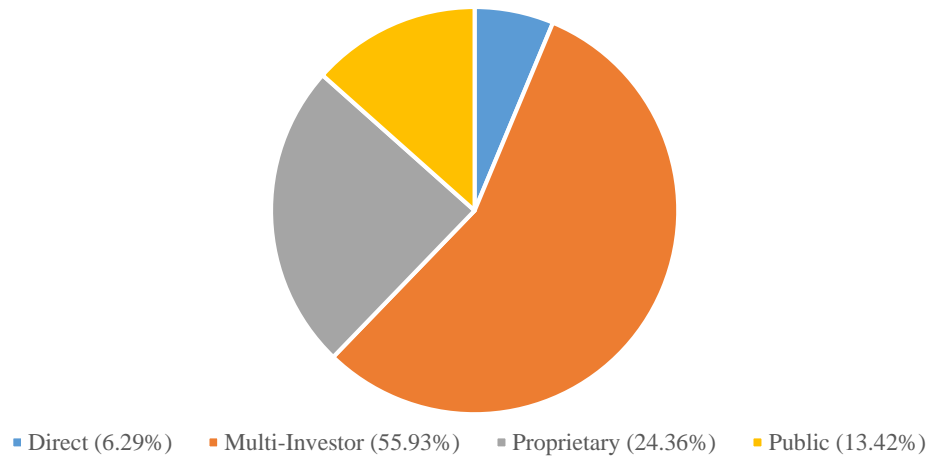


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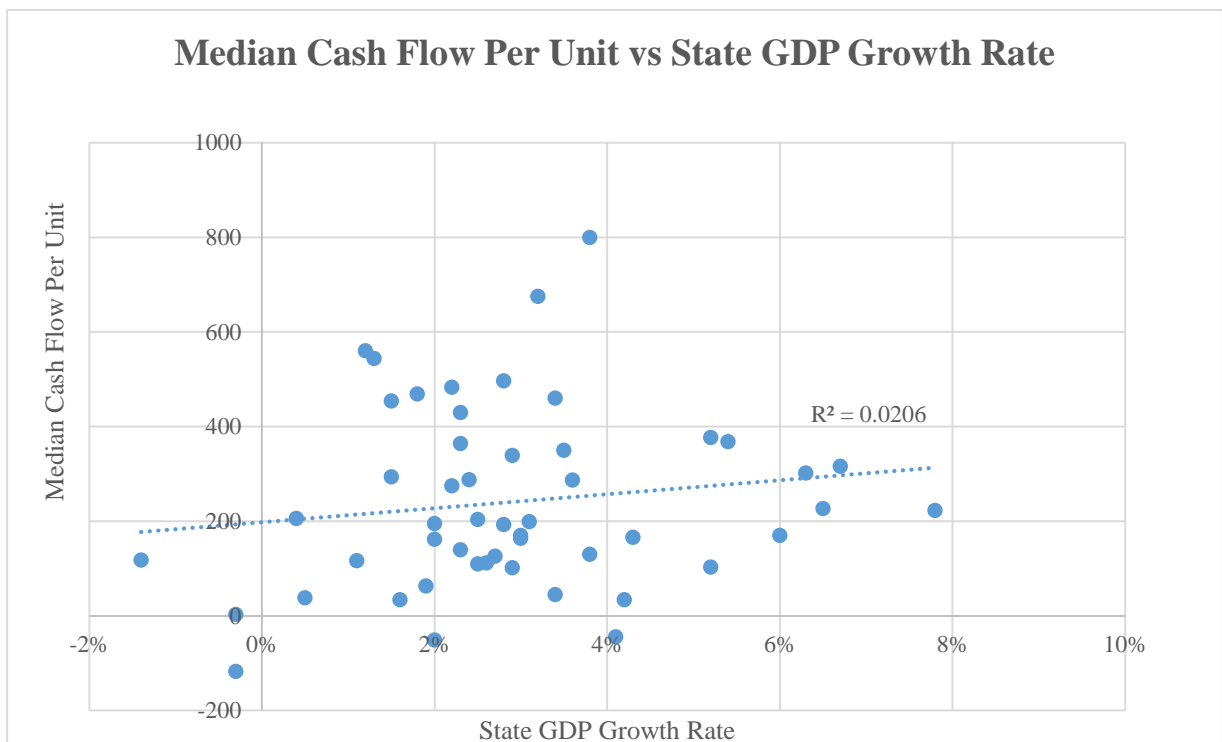


Figure 3

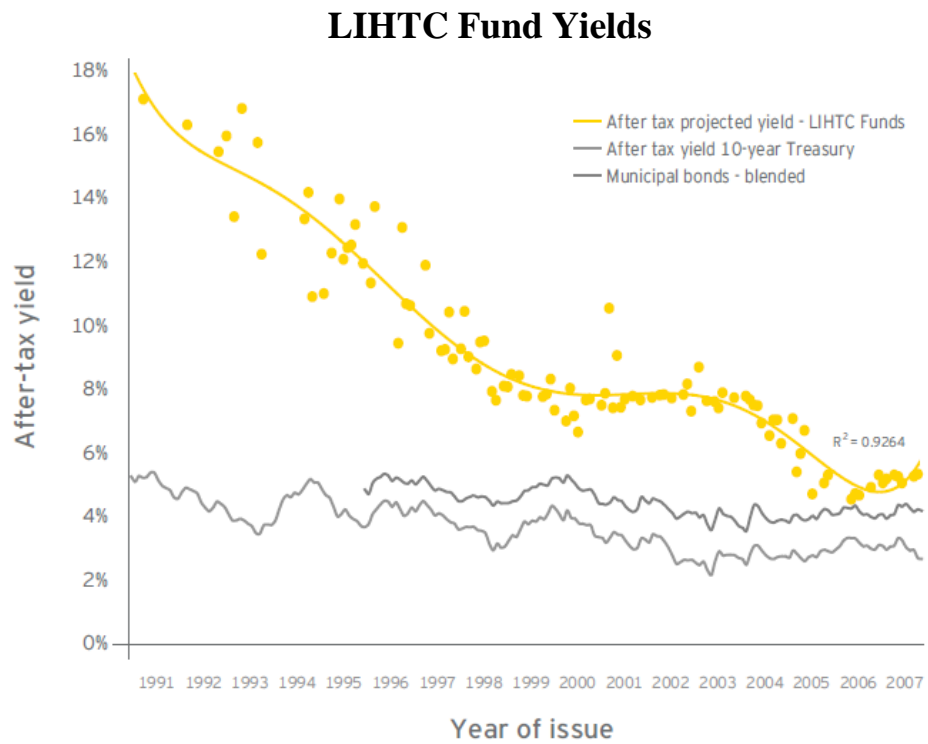


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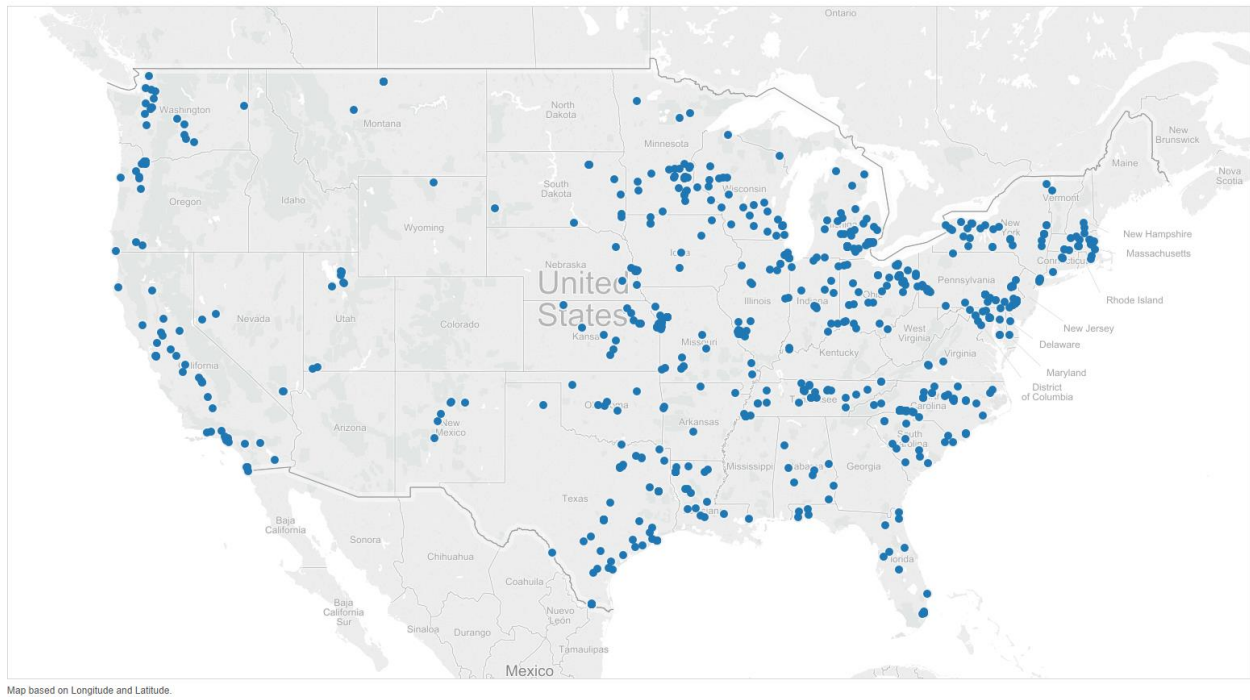


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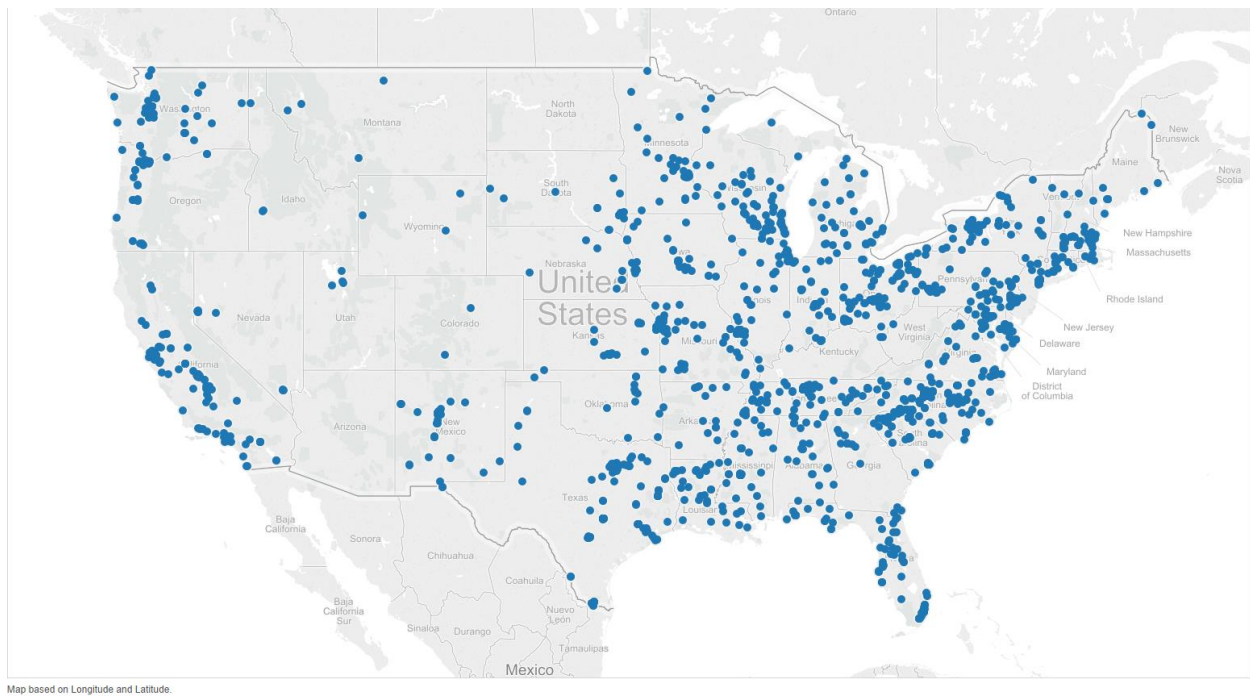


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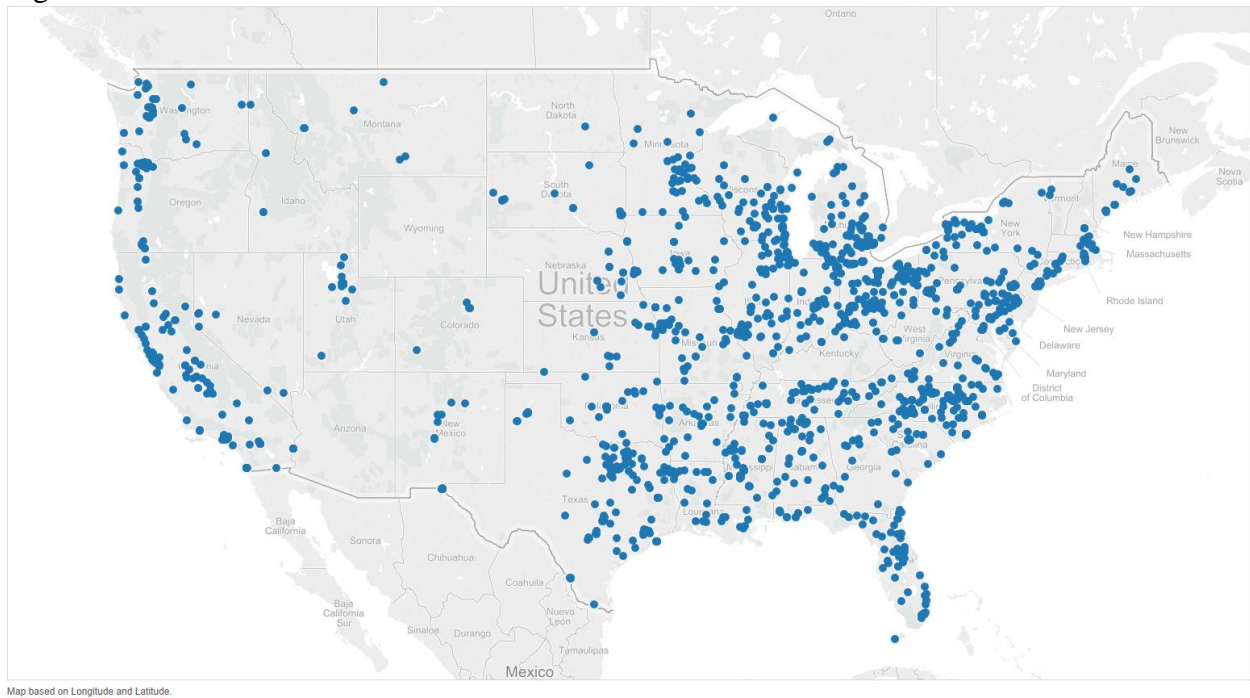


Figure 7 – 1990

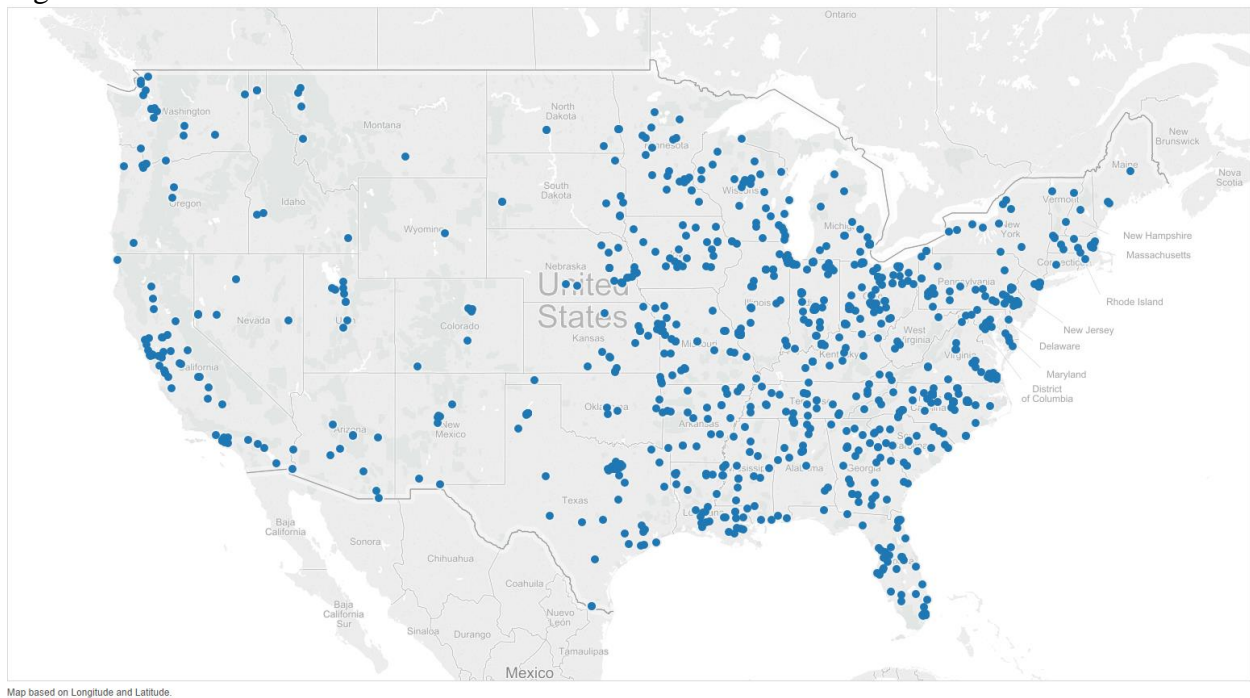


Figure 8 – 1991

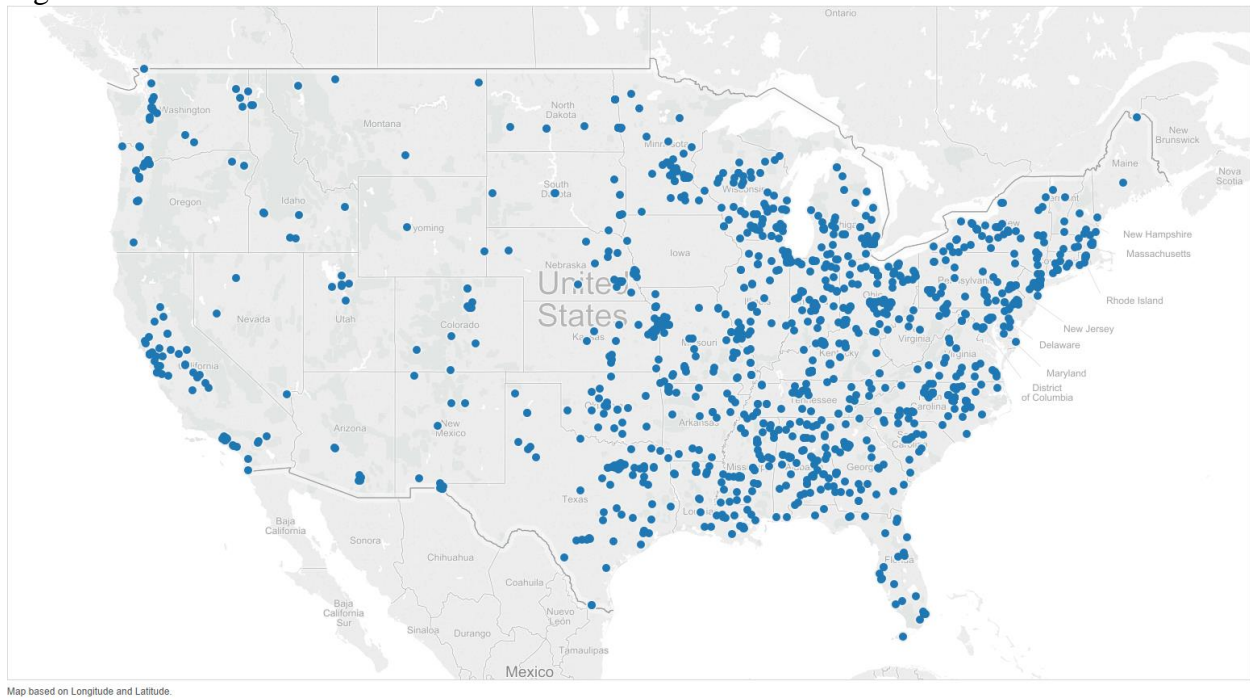


Figure 9 – 1992

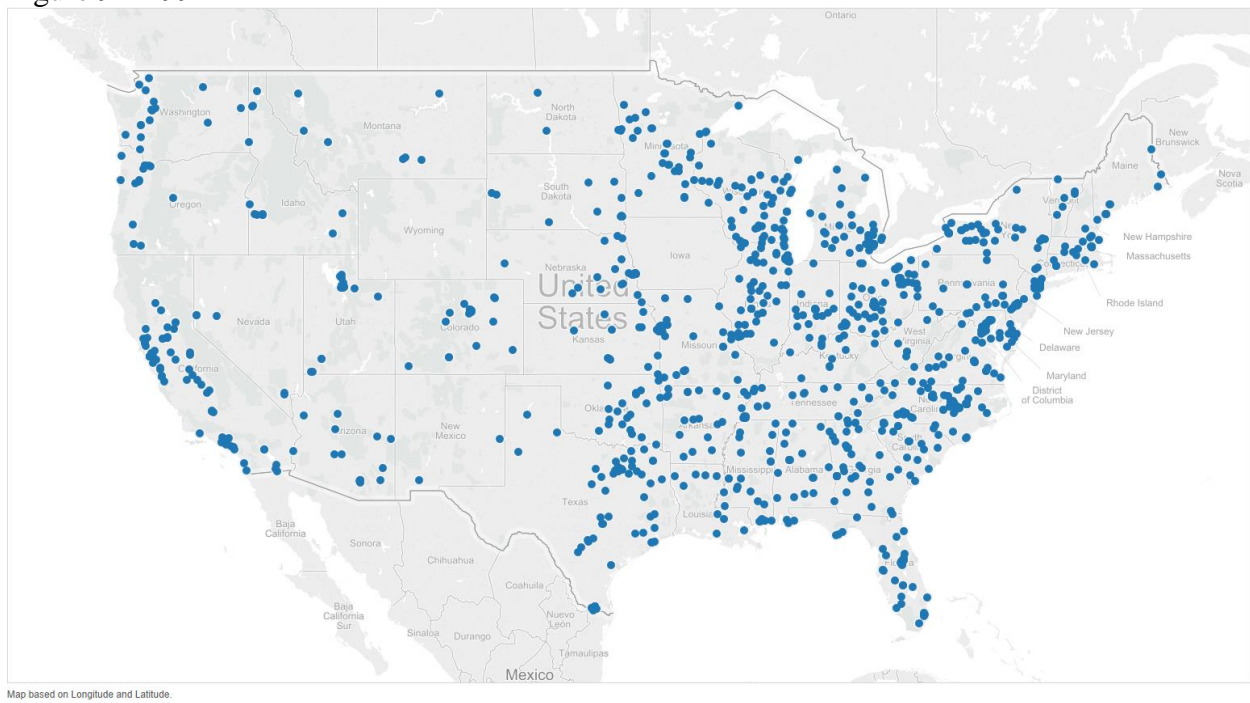


Figure 10 – 1993

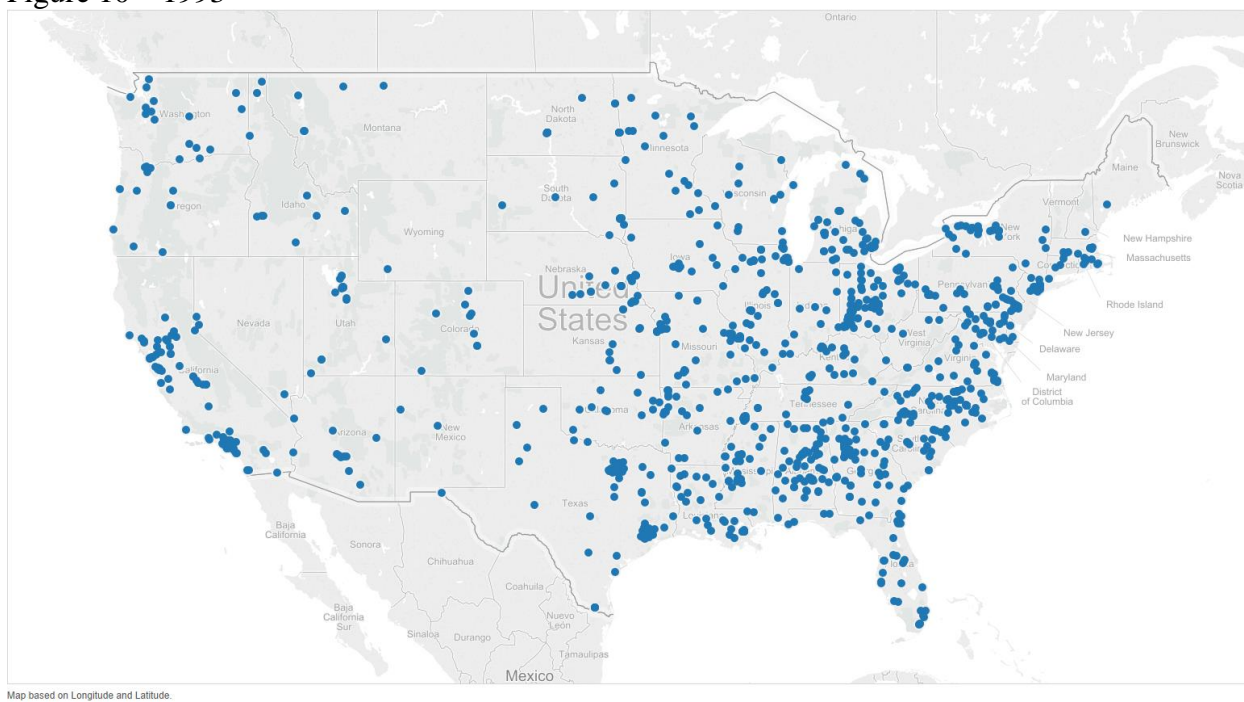


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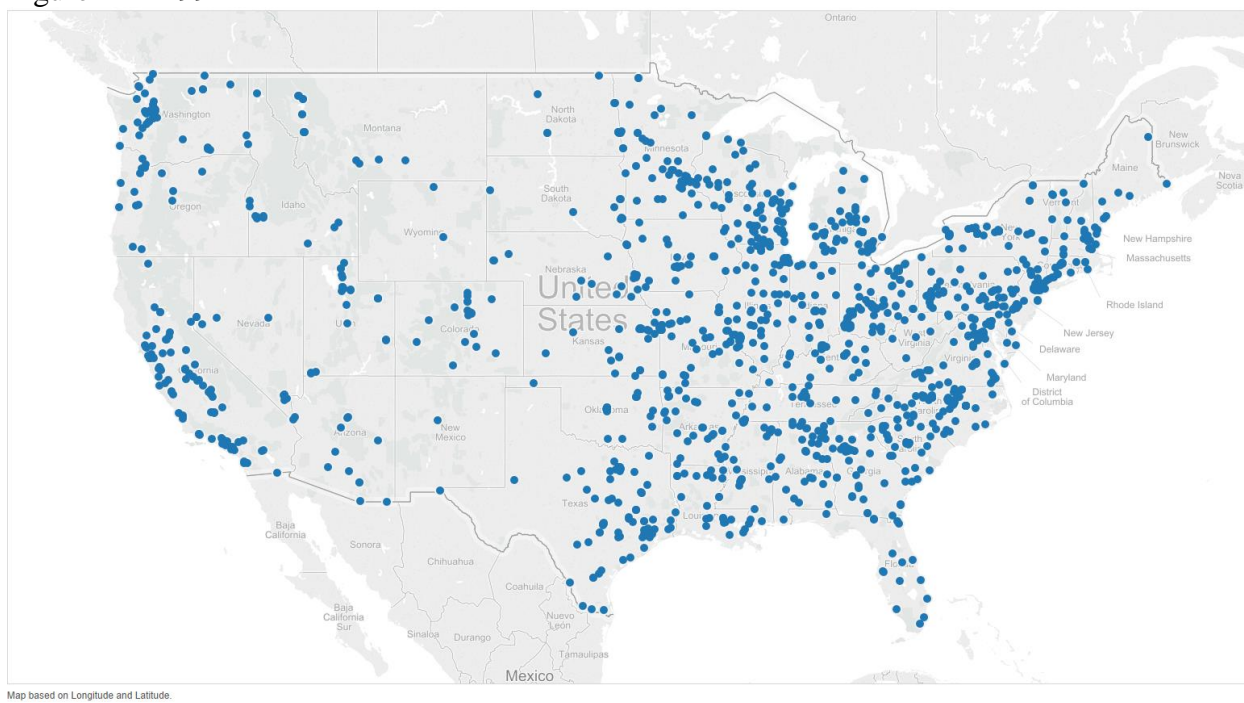


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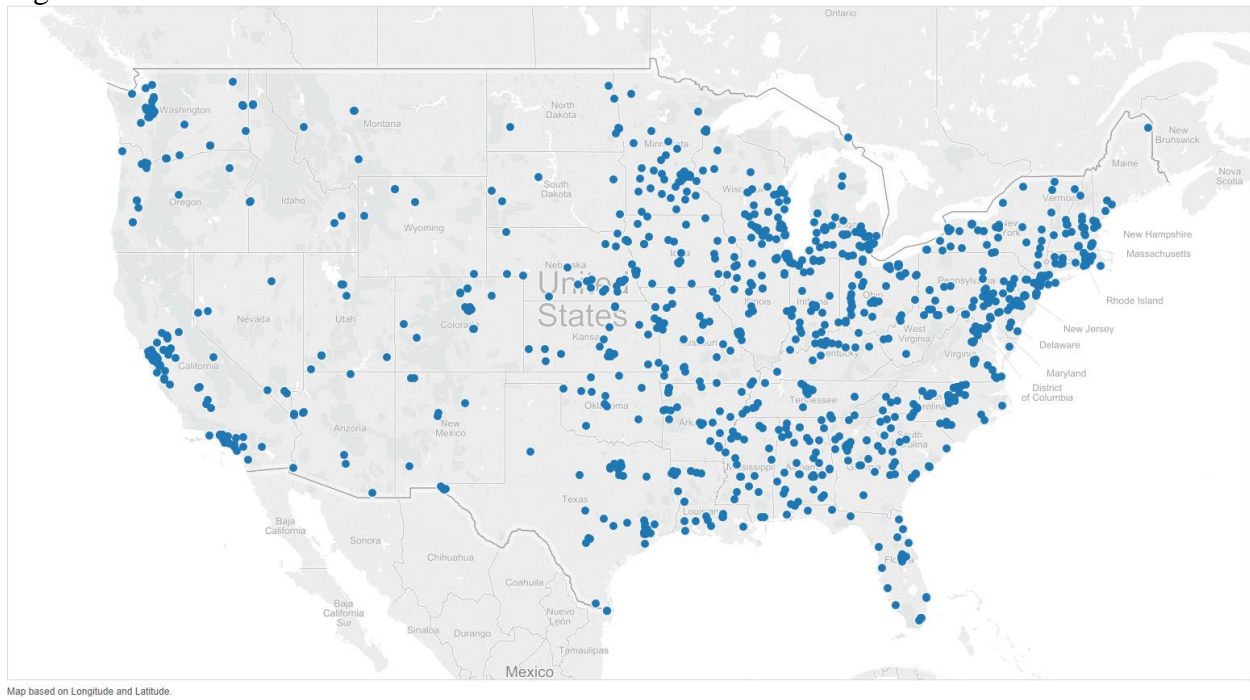
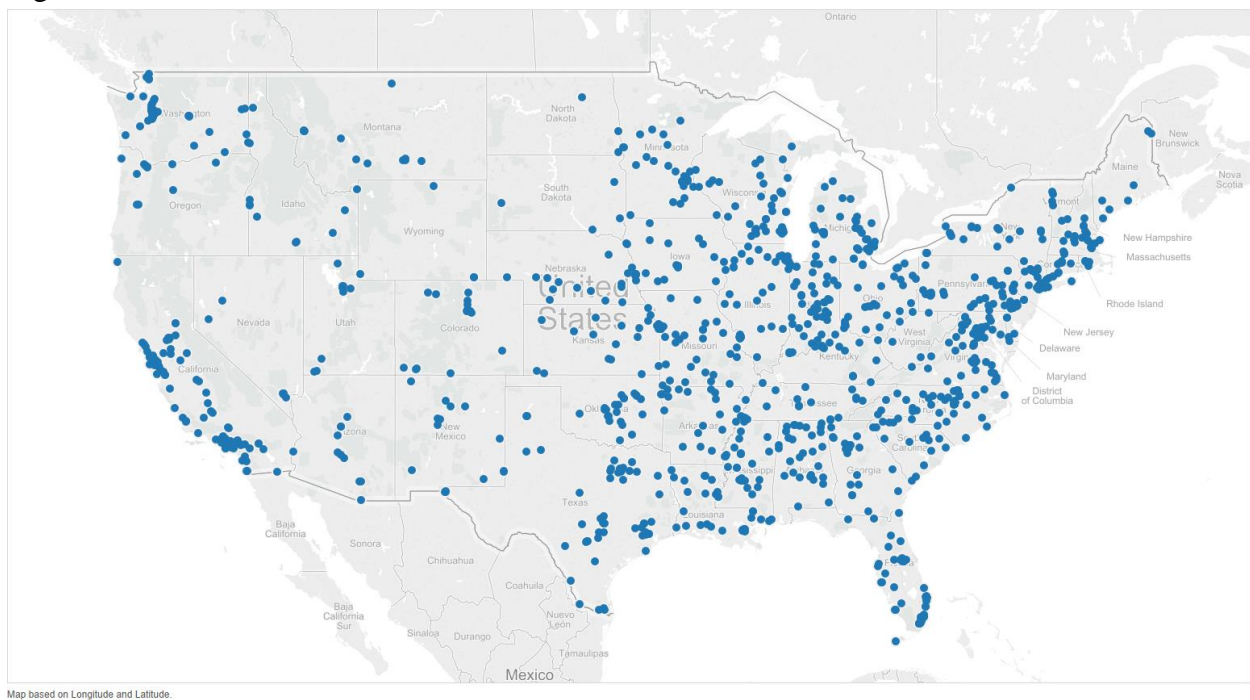


Figure 13 – 1996



Map based on Longitude and Latitude.

Map based on Longitude and Latitude.

Figure 16 – 2000

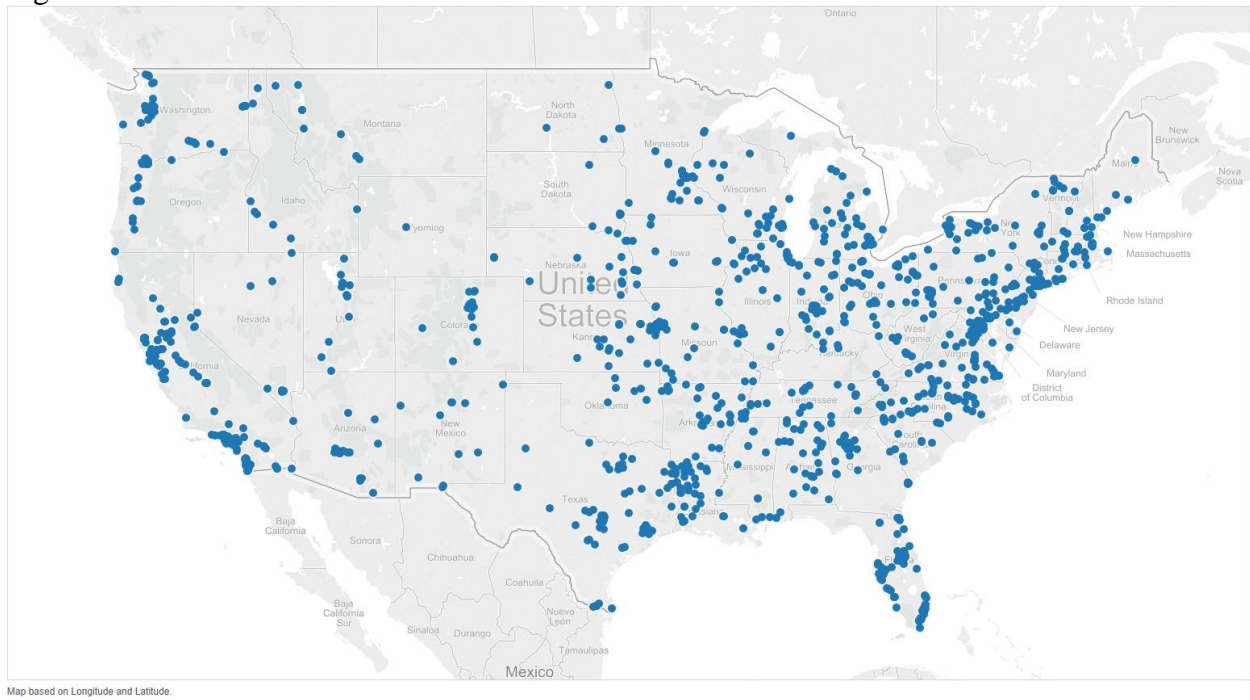


Figure 17 - 2001

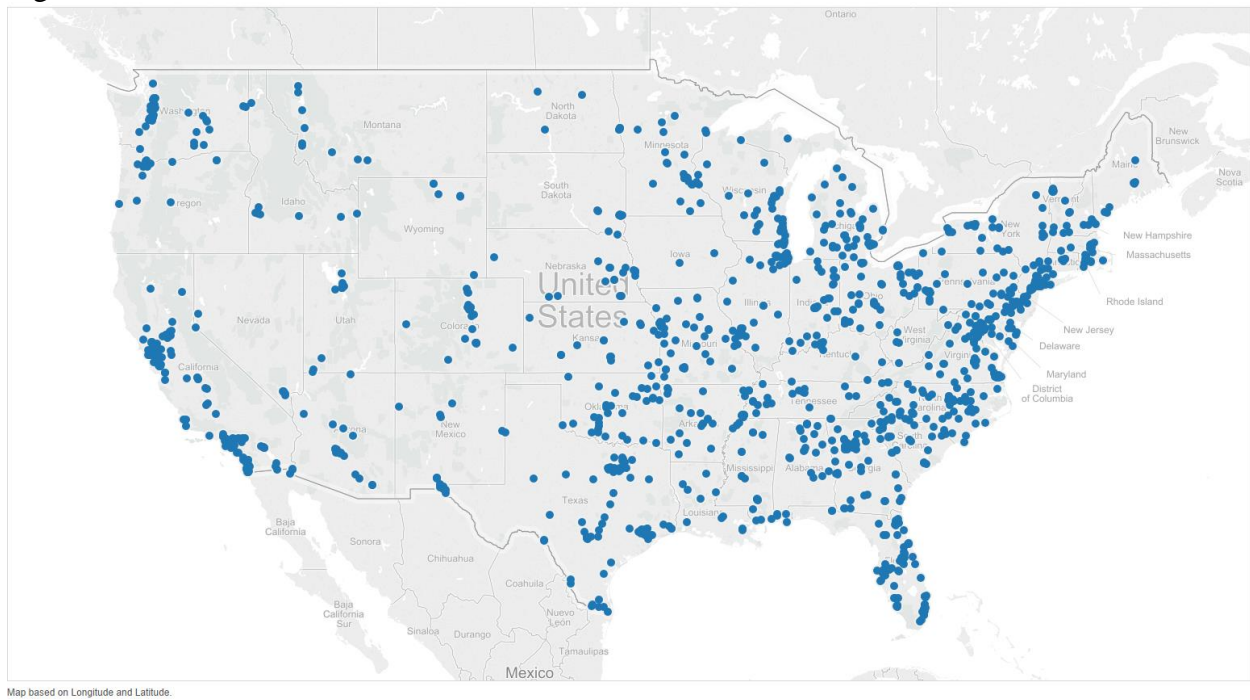
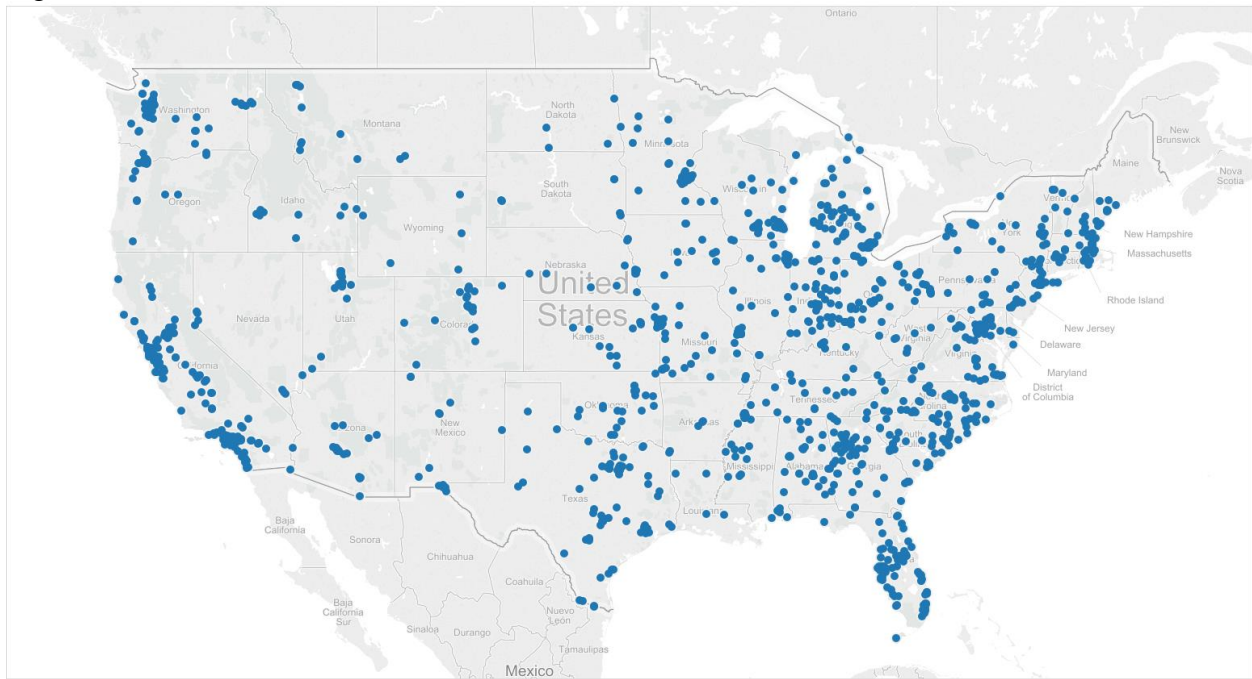
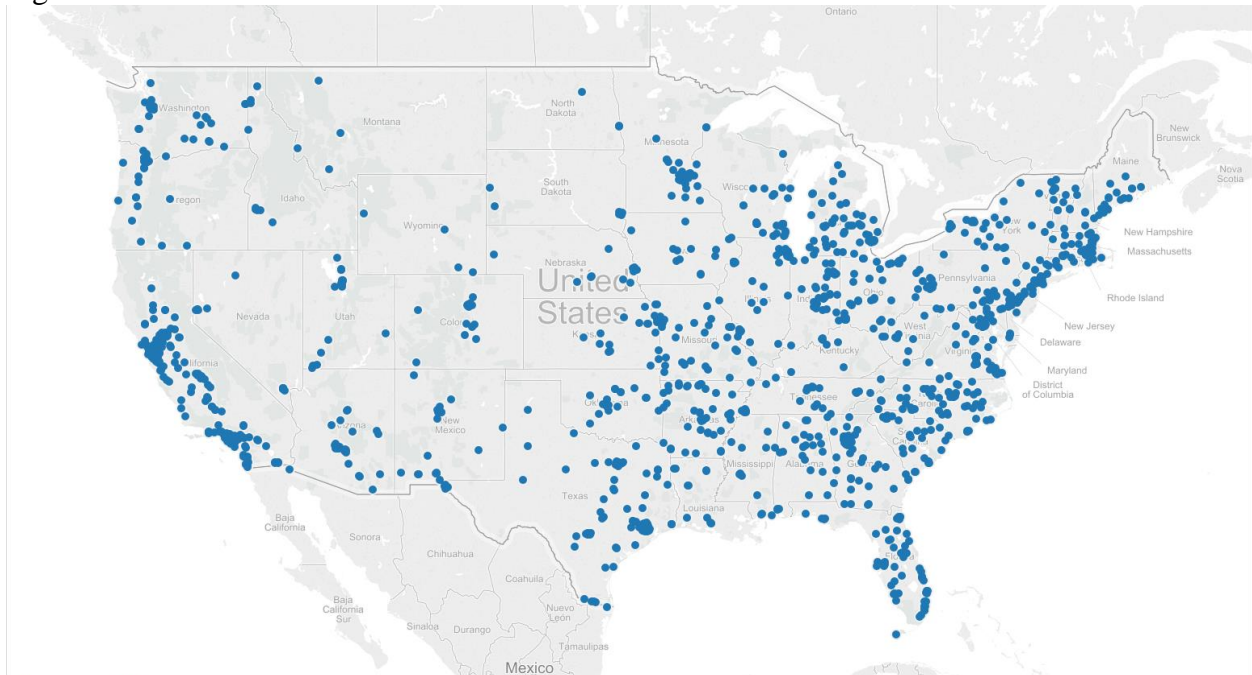


Figure 18 - 2002



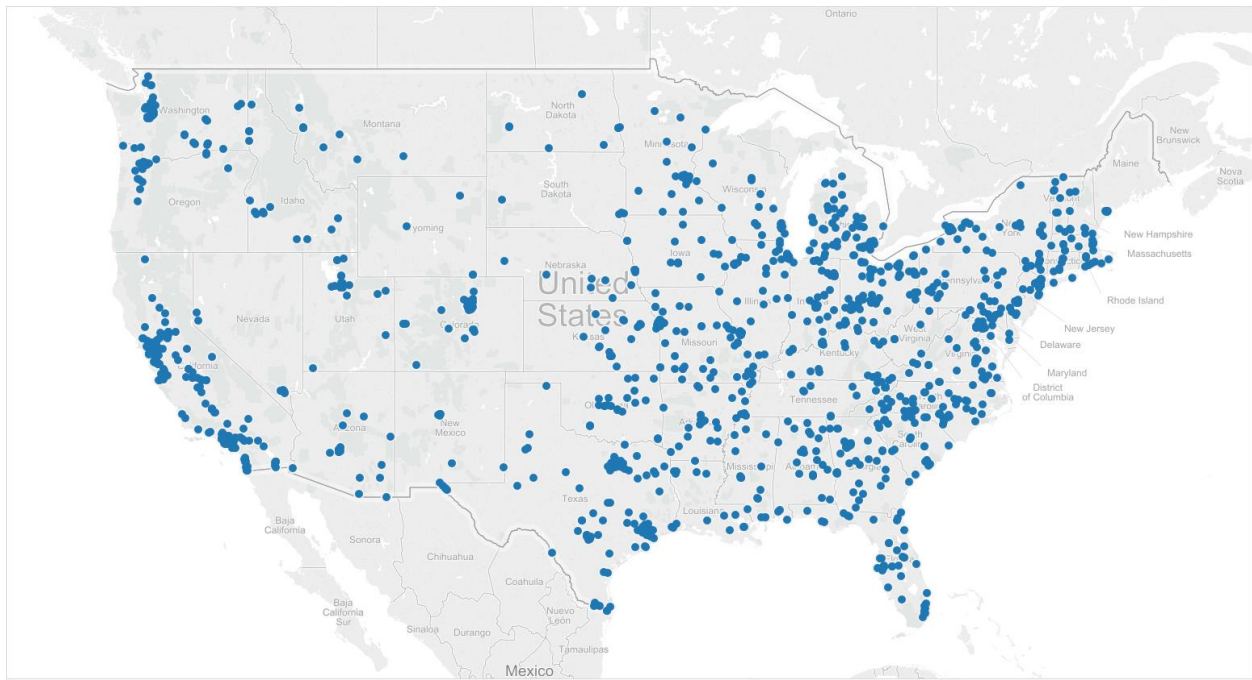
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Figure 19 - 2003



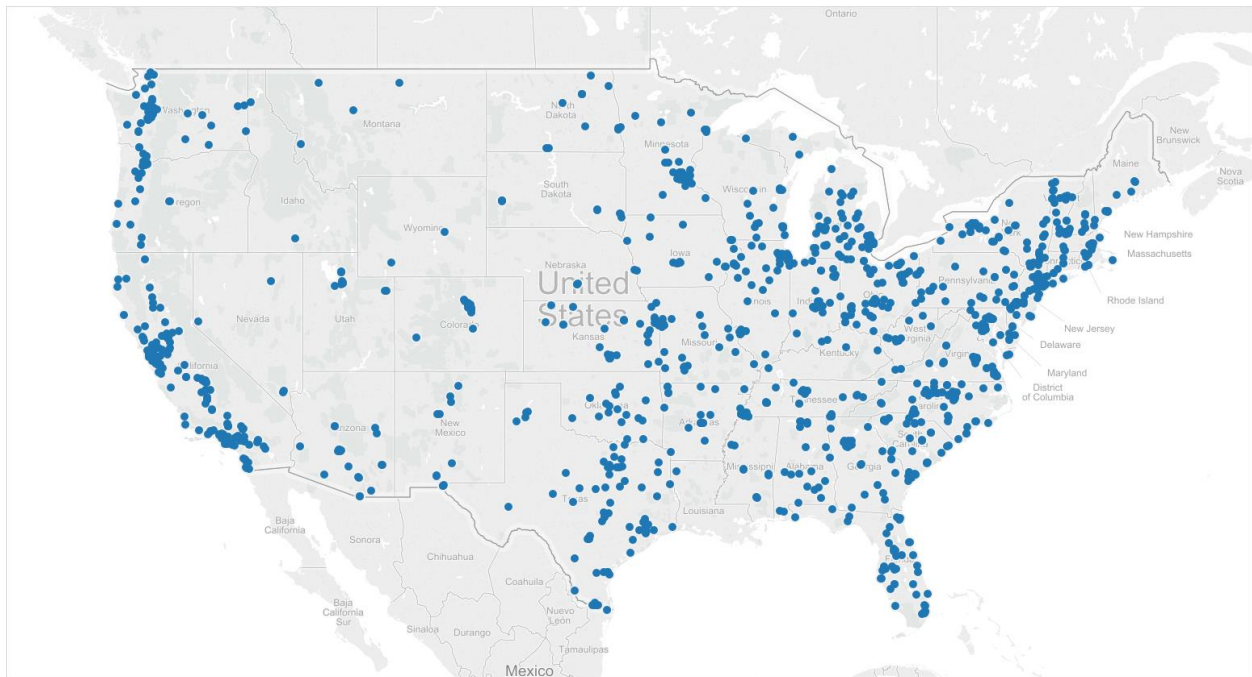
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Figure 20 – 2004



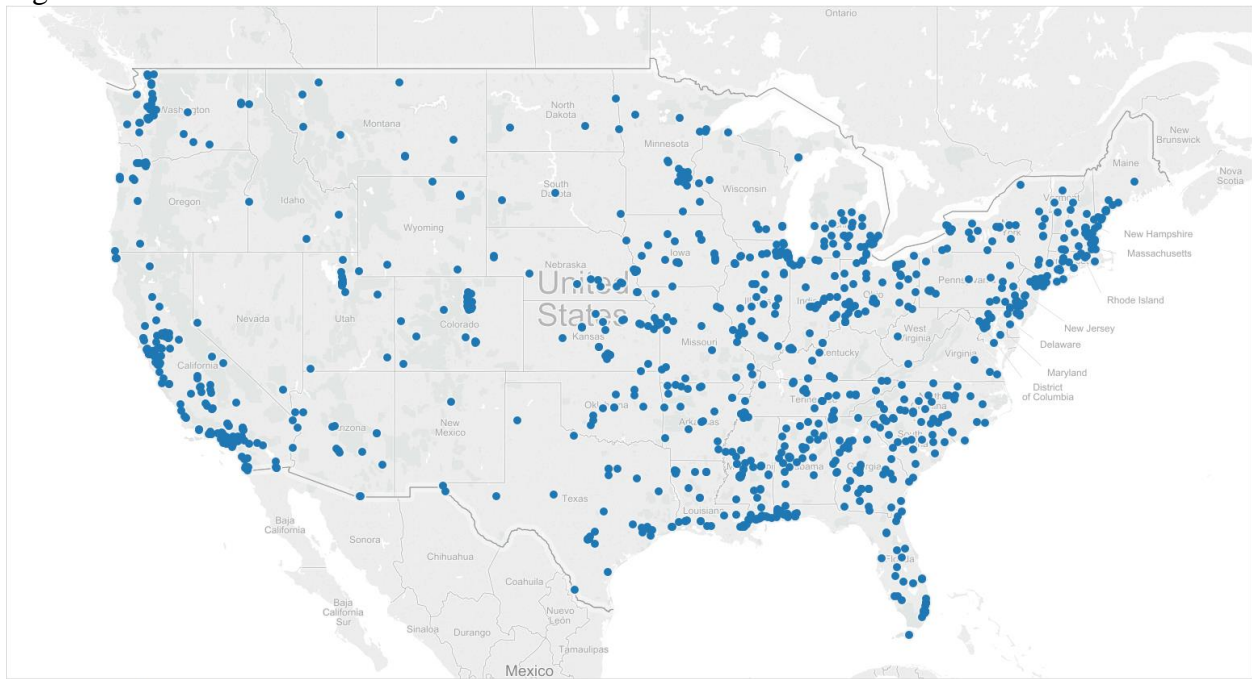
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Figure 21- 2005



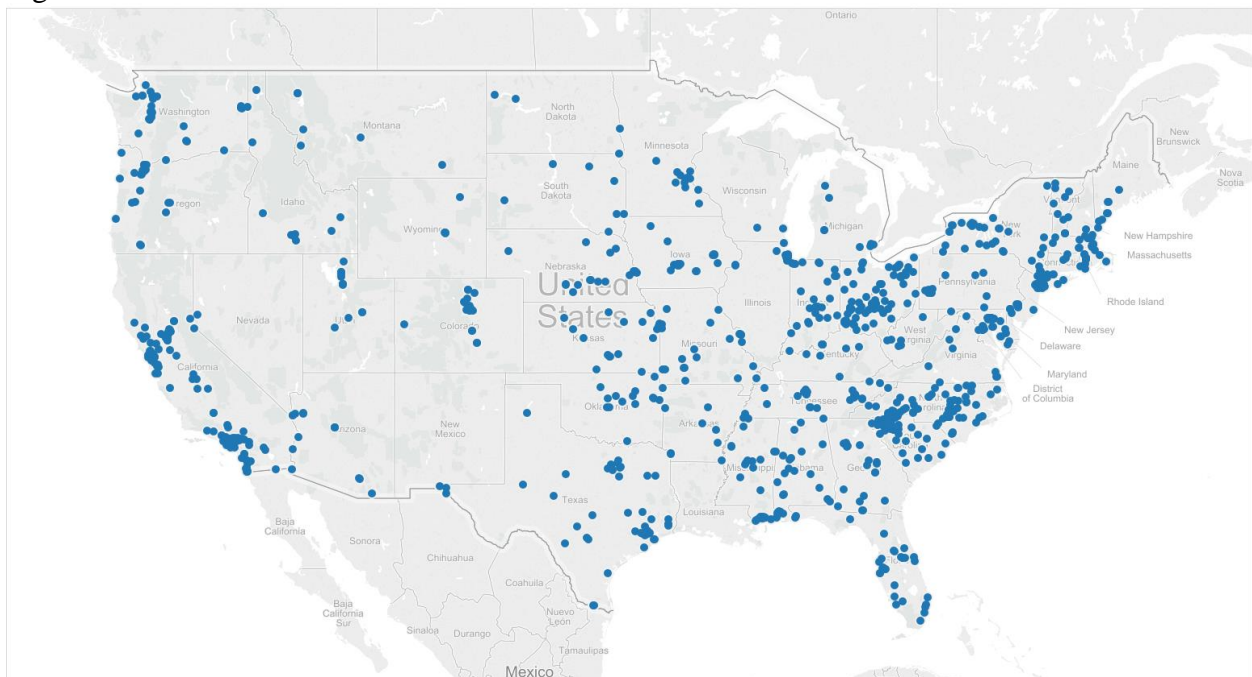
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Figure 22 - 2006



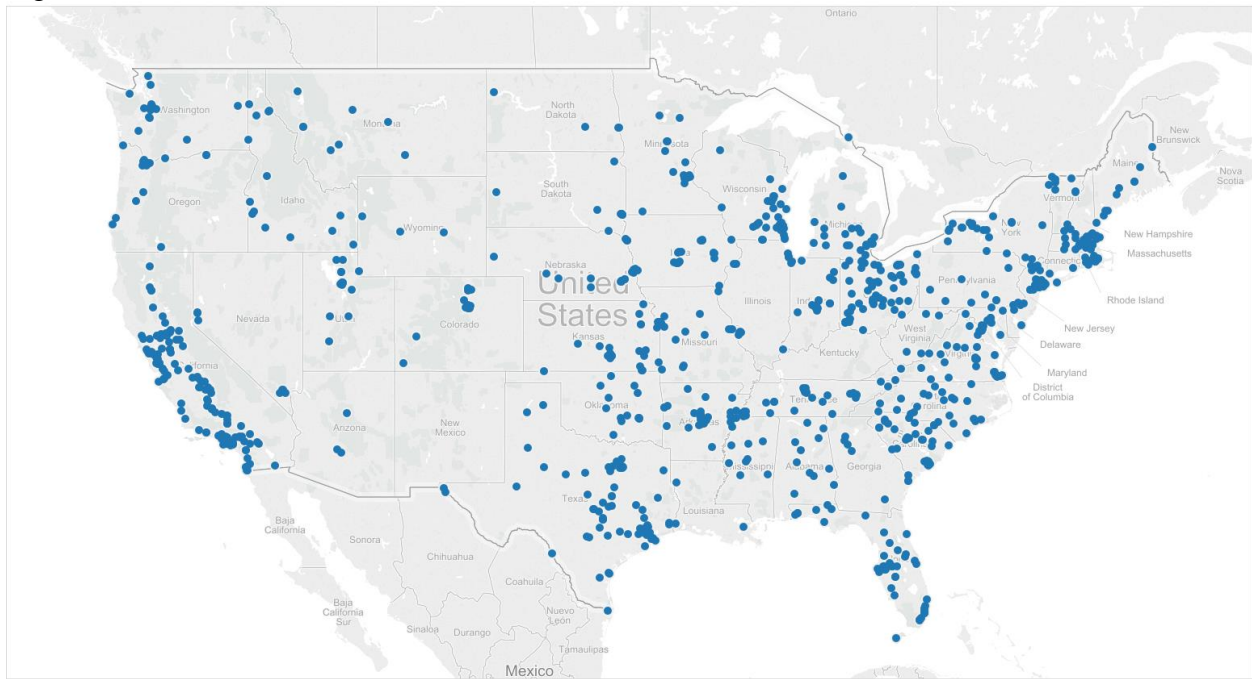
Map based on Longitude and Latitude.

Figure 23 - 2007



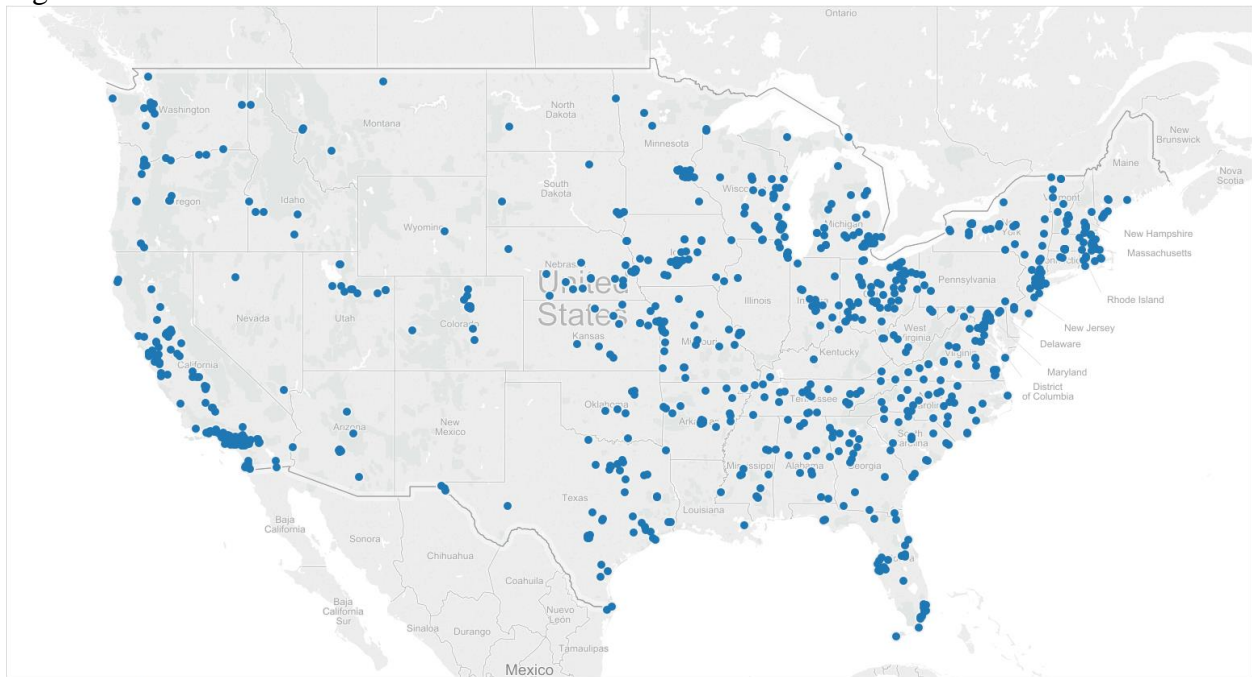
Map based on Longitude and Latitude.

Figure 24 - 2008



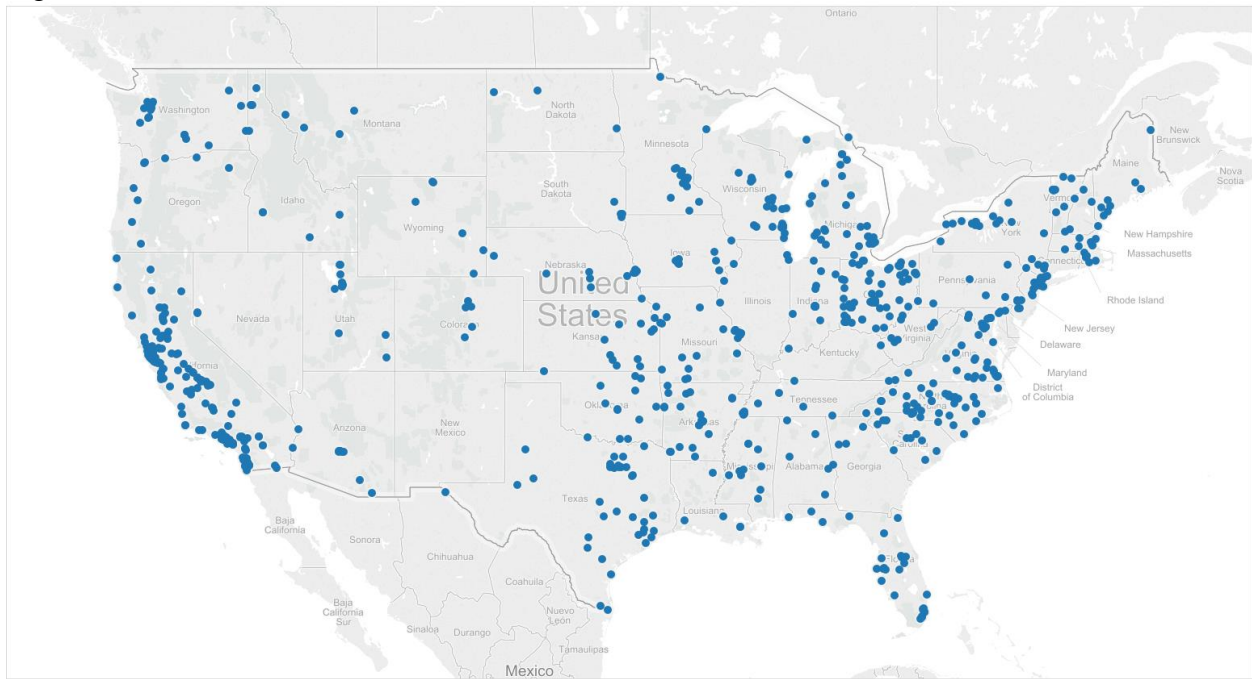
Map based on Longitude and Latitude.

Figure 25 - 2009



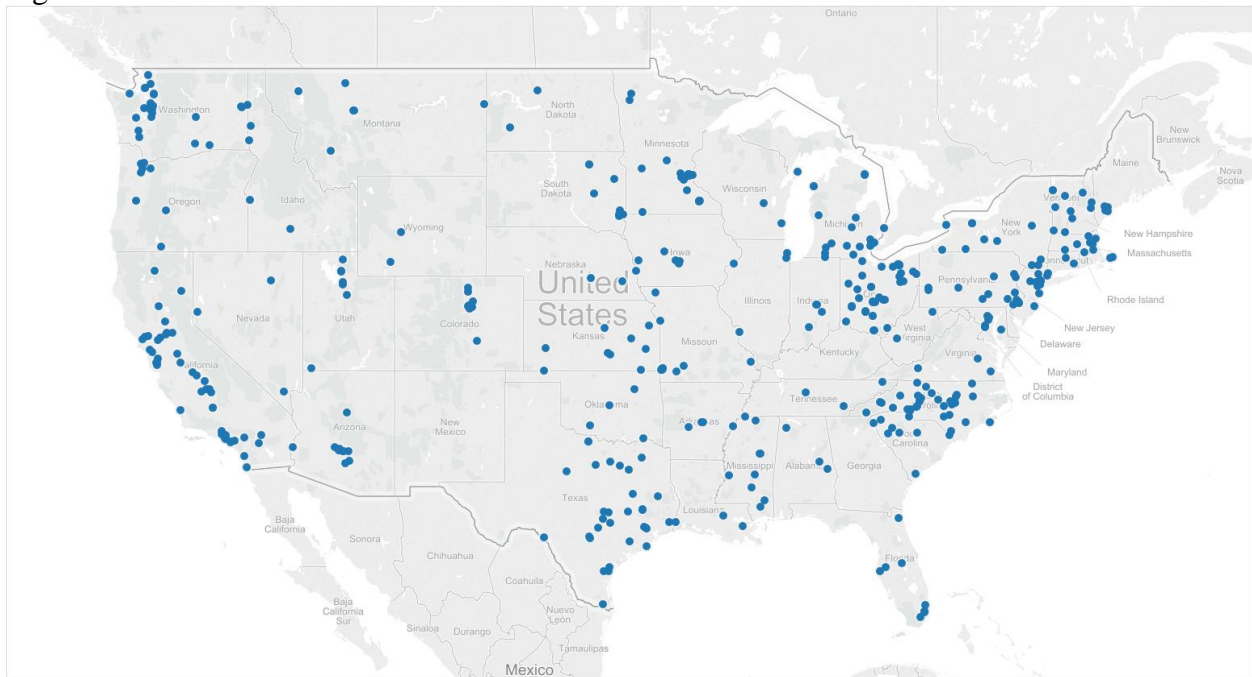
Map based on Longitude and Latitude.

Figure 26 -2010



Map based on Longitude and Latitude.

Figure 27 – 2011



Map based on Longitude and Latitude.

Figure 28 - 2012

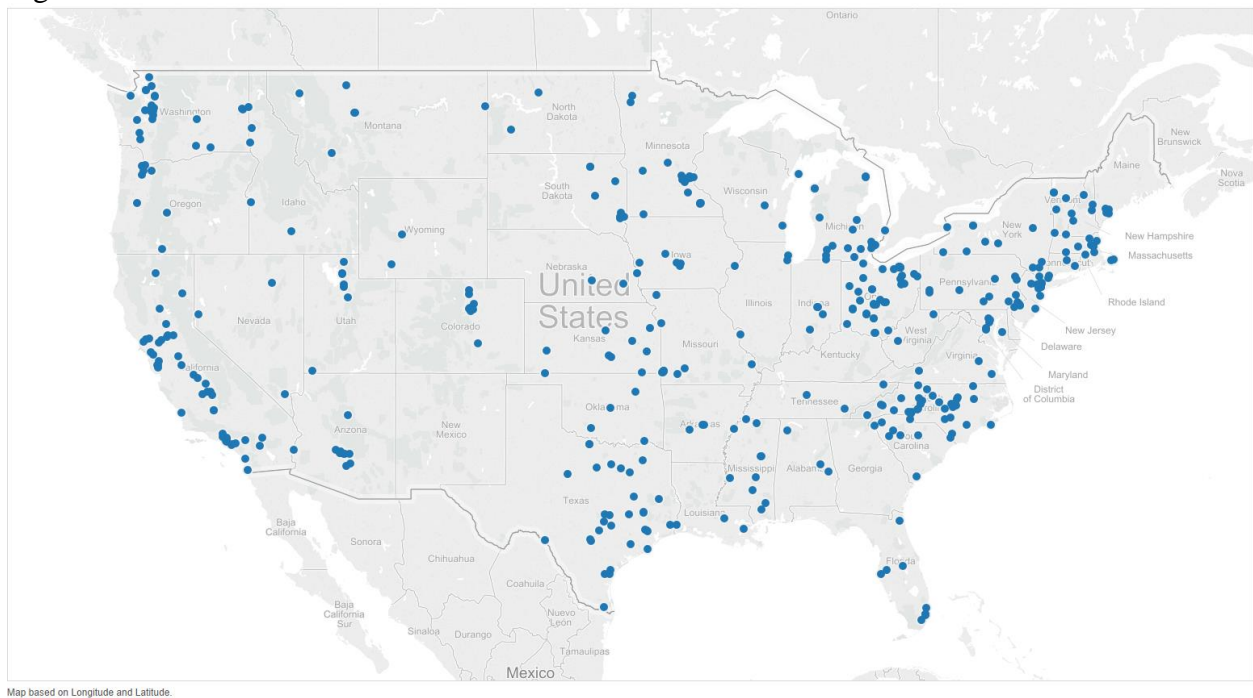


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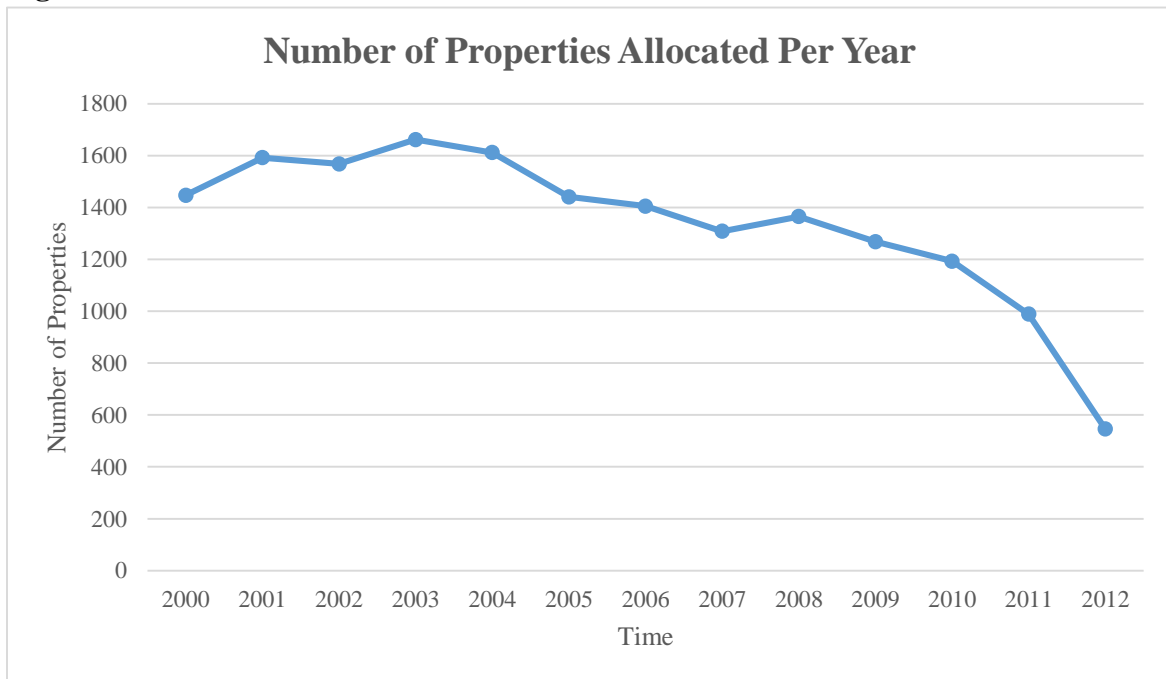


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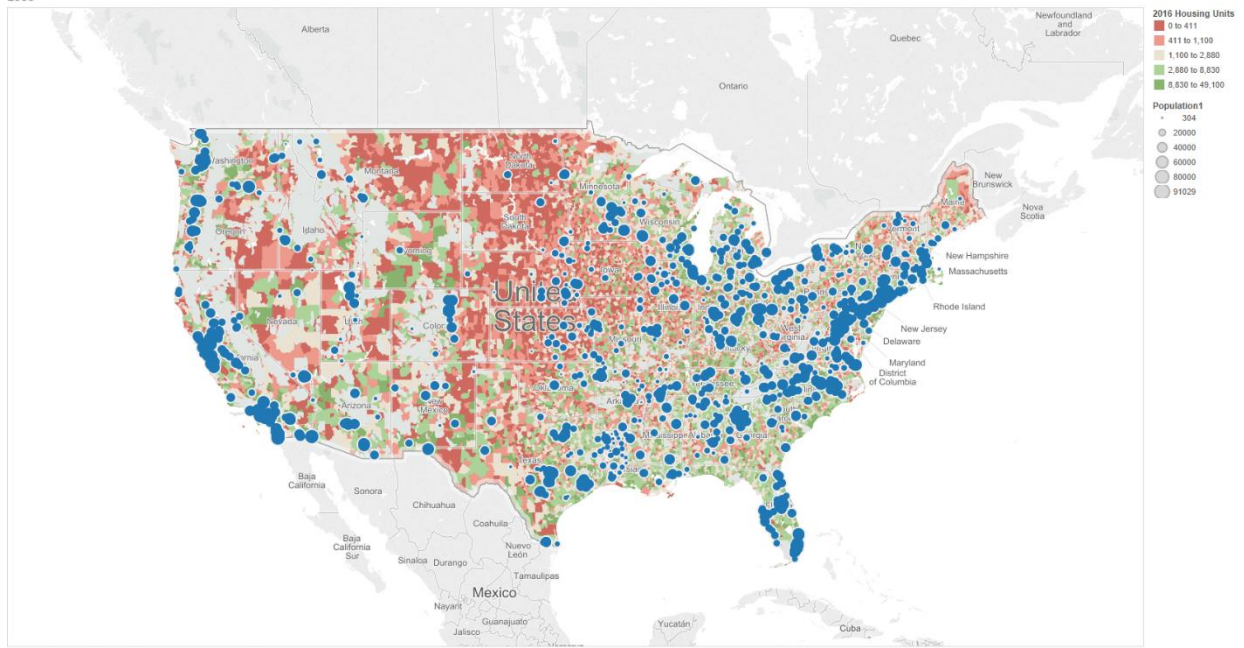


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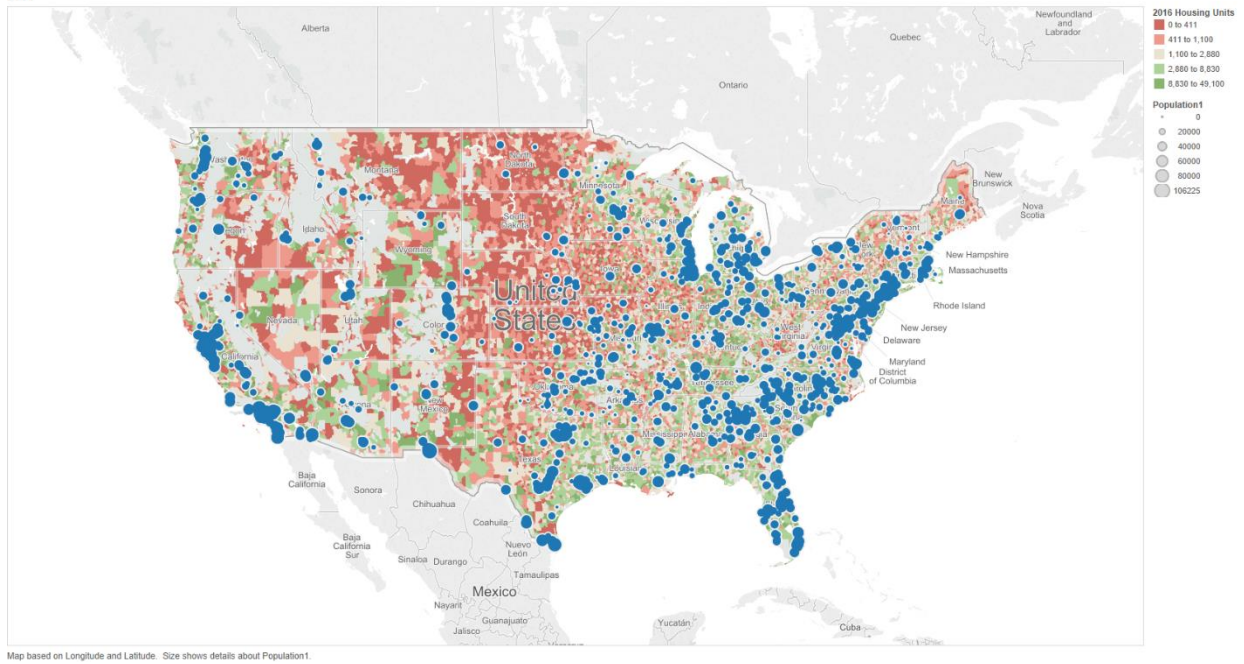


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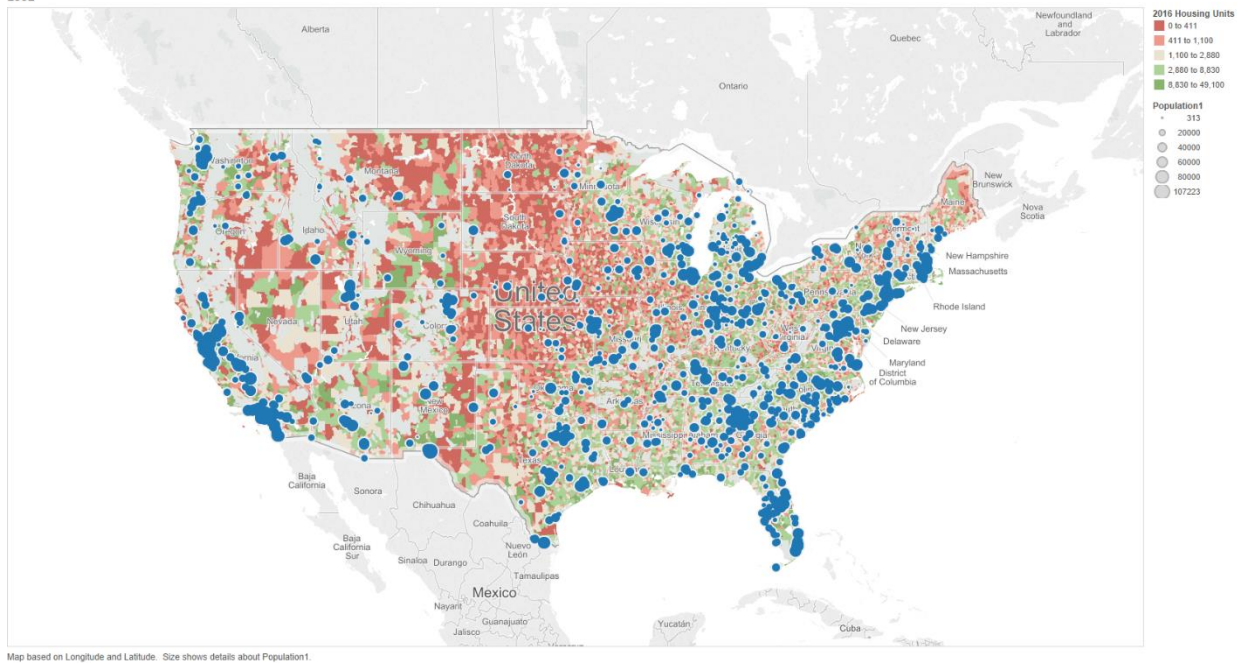


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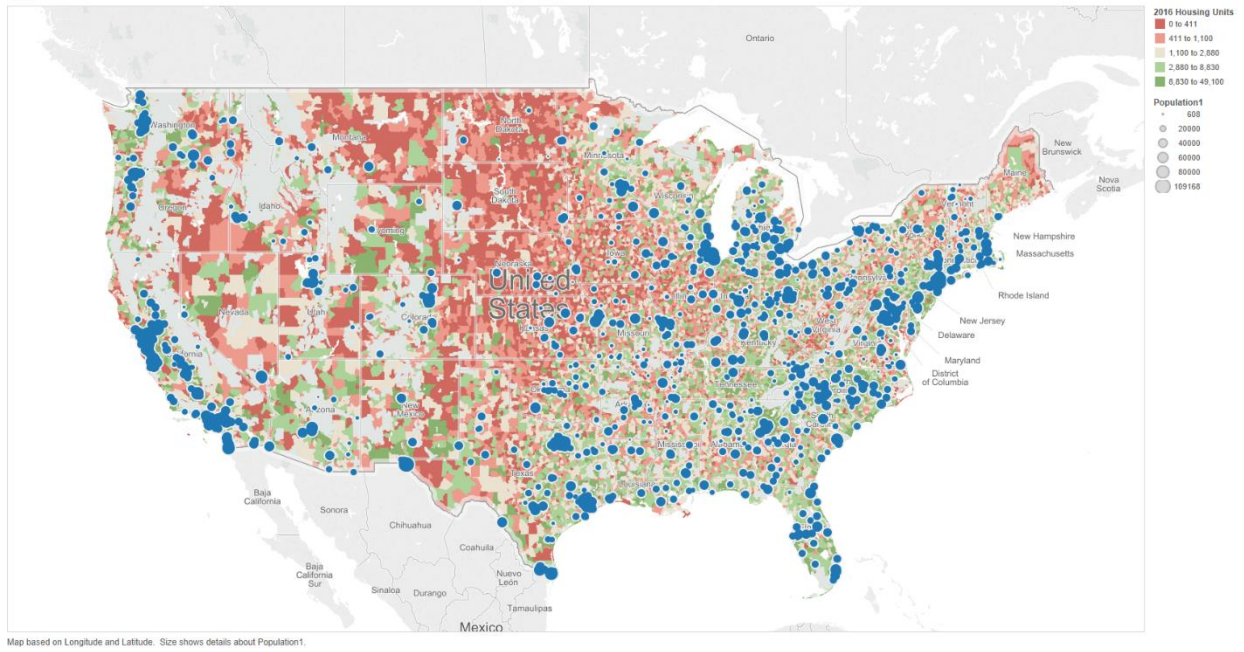


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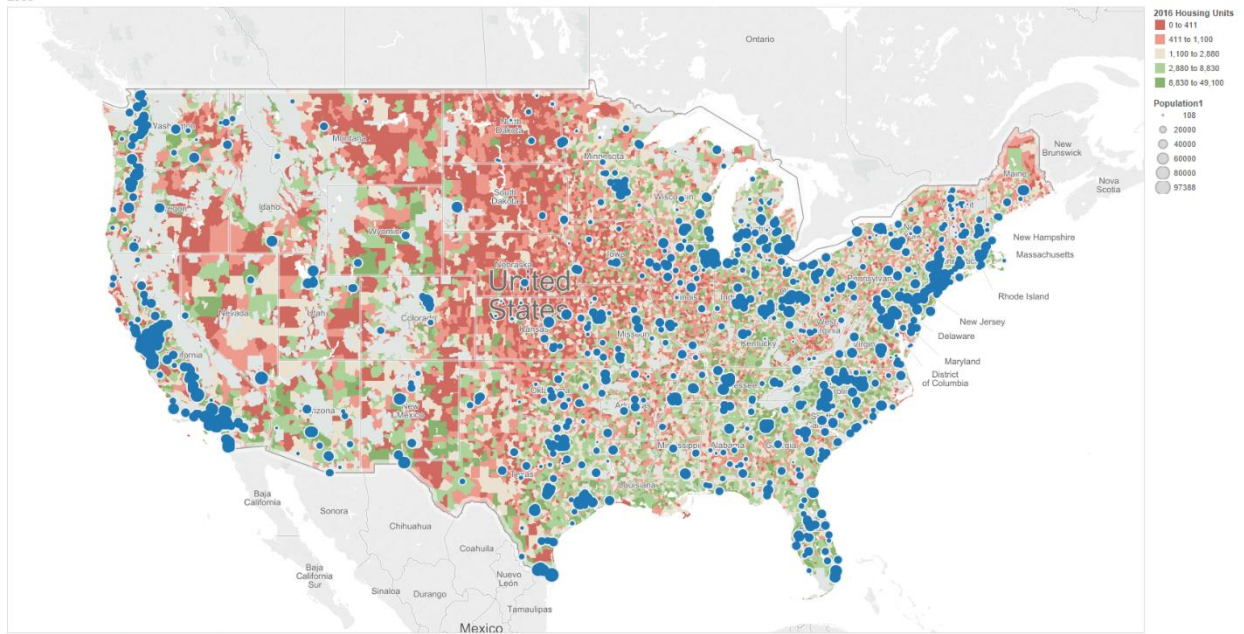


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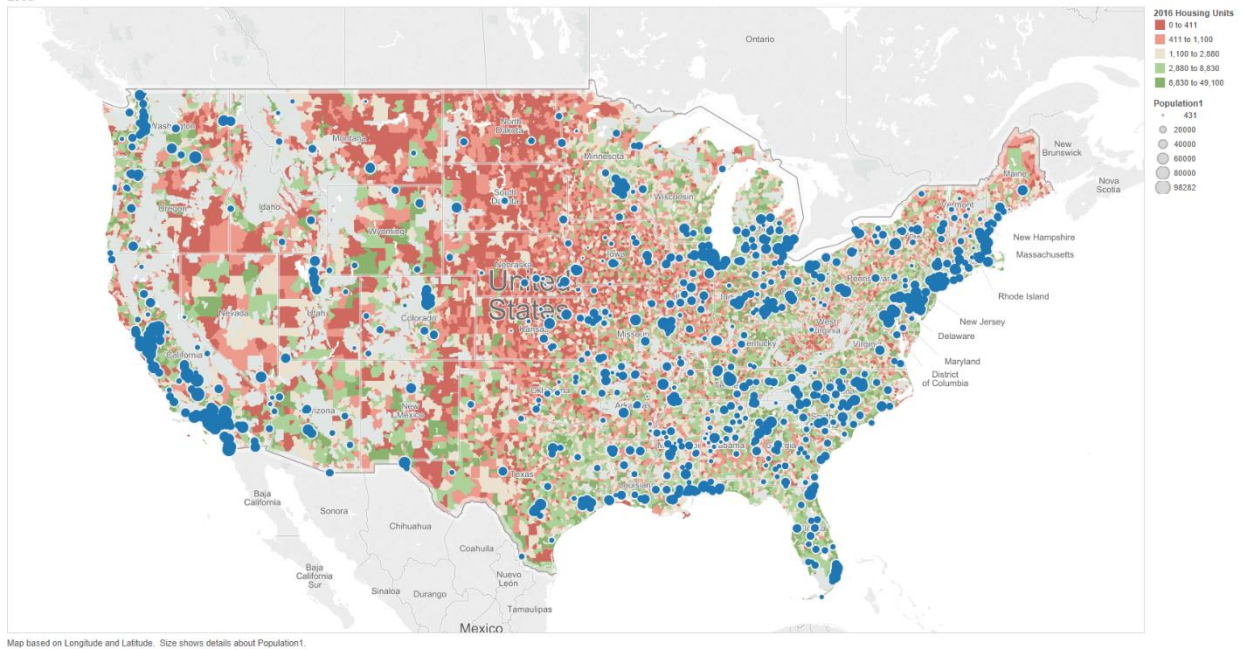


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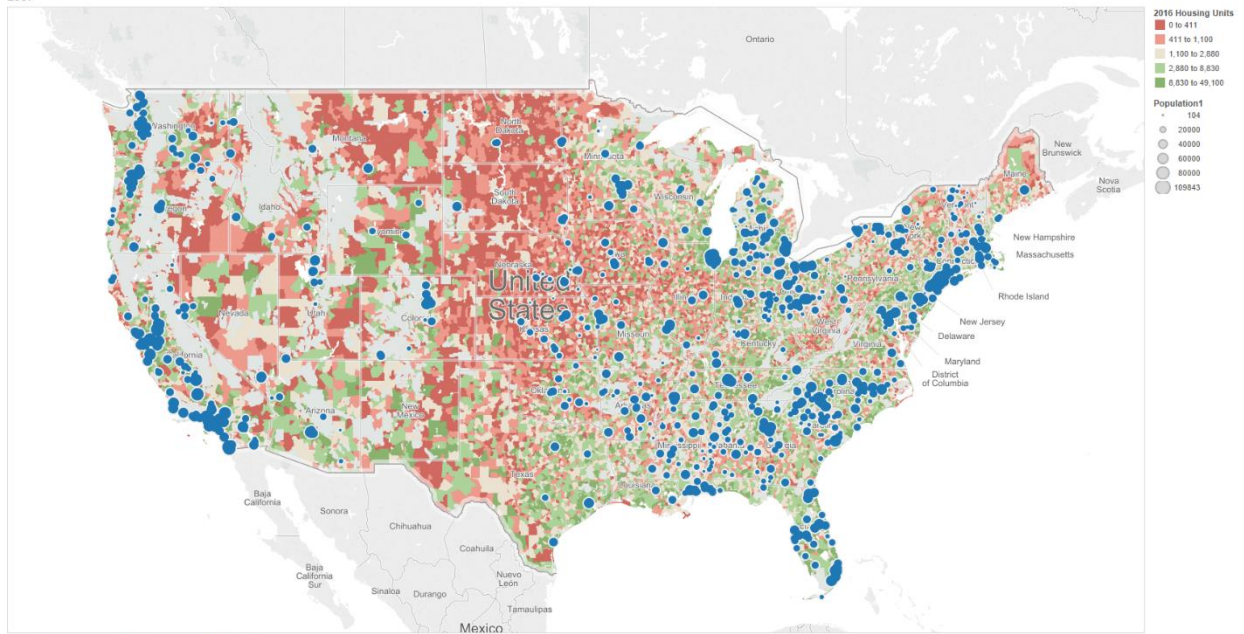


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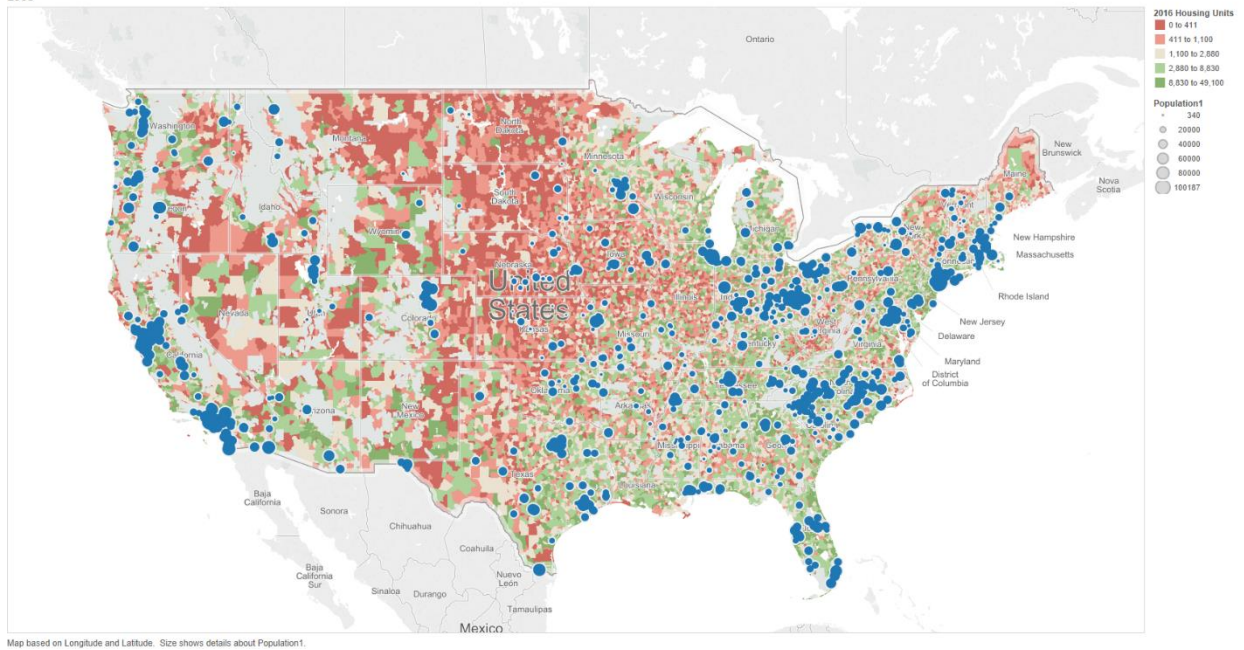


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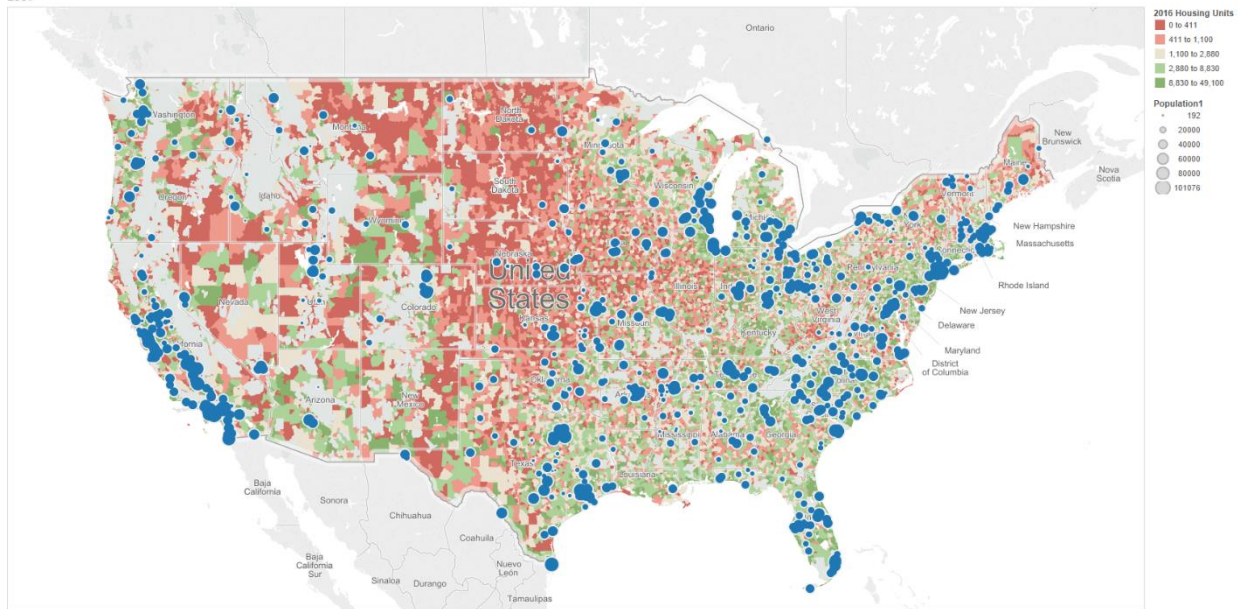


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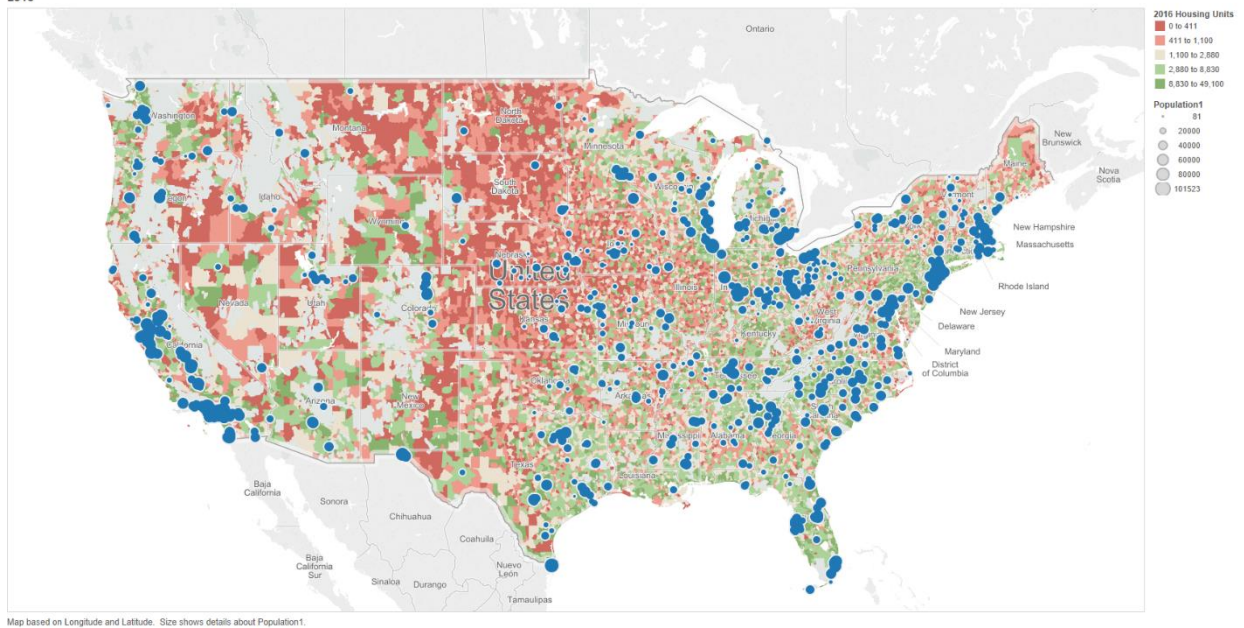


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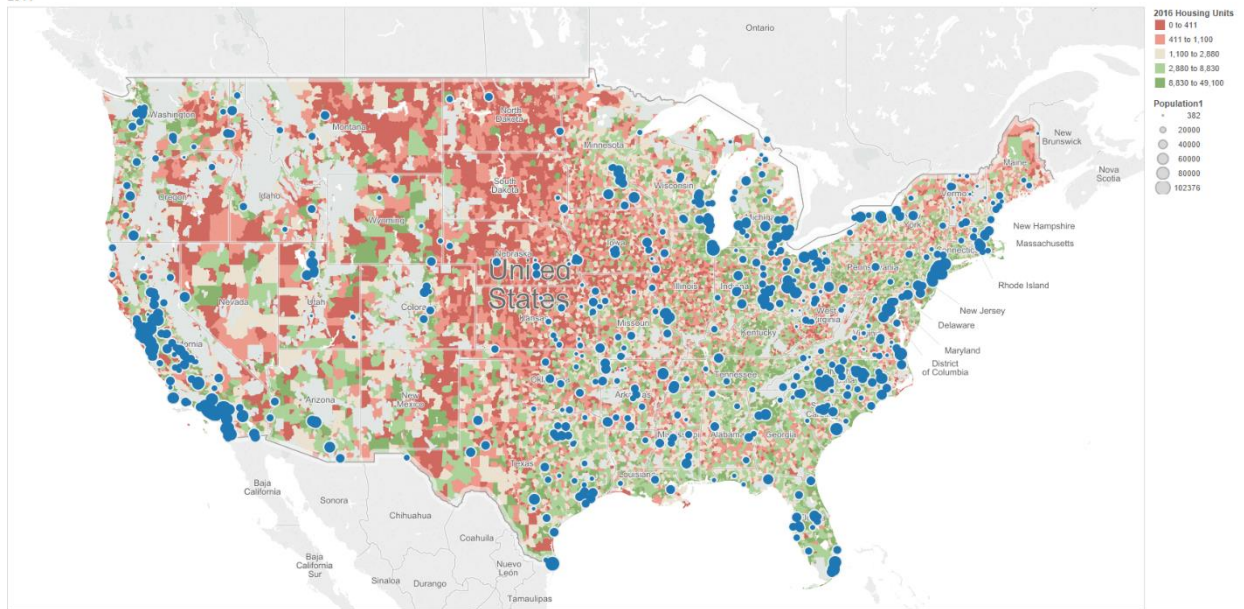


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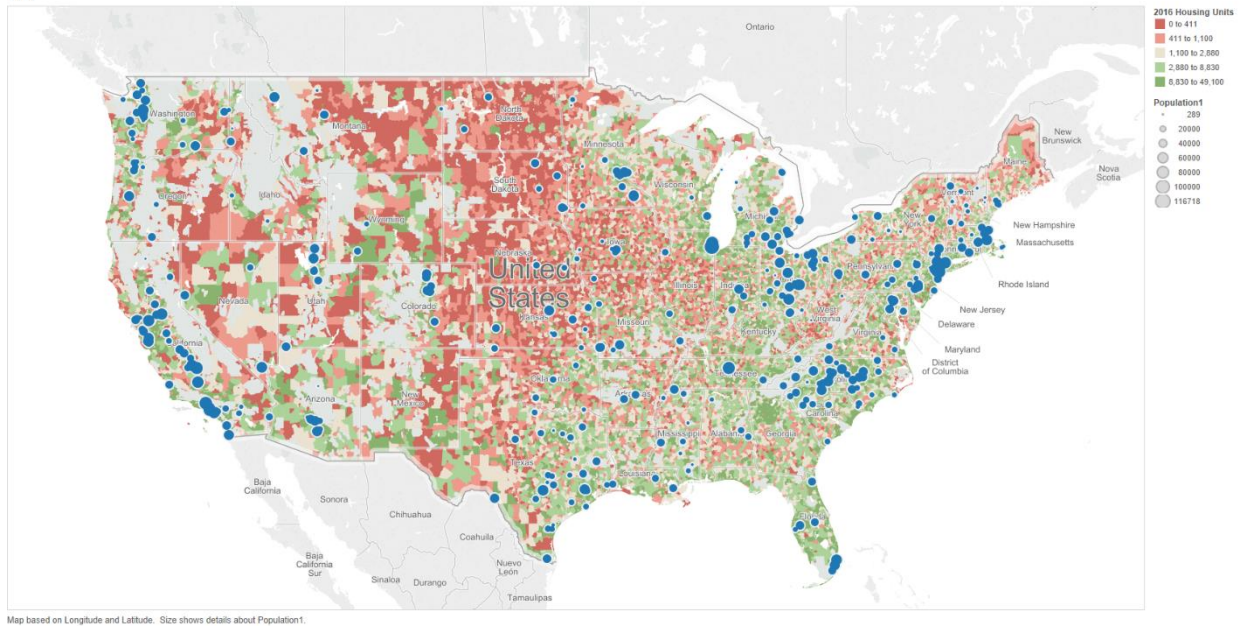


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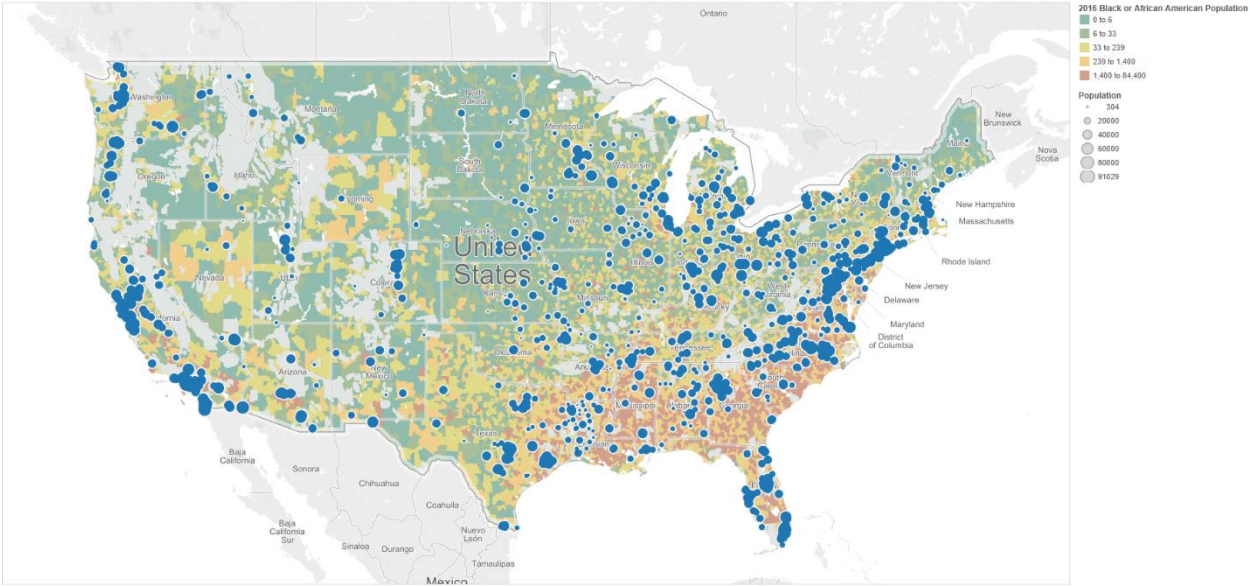


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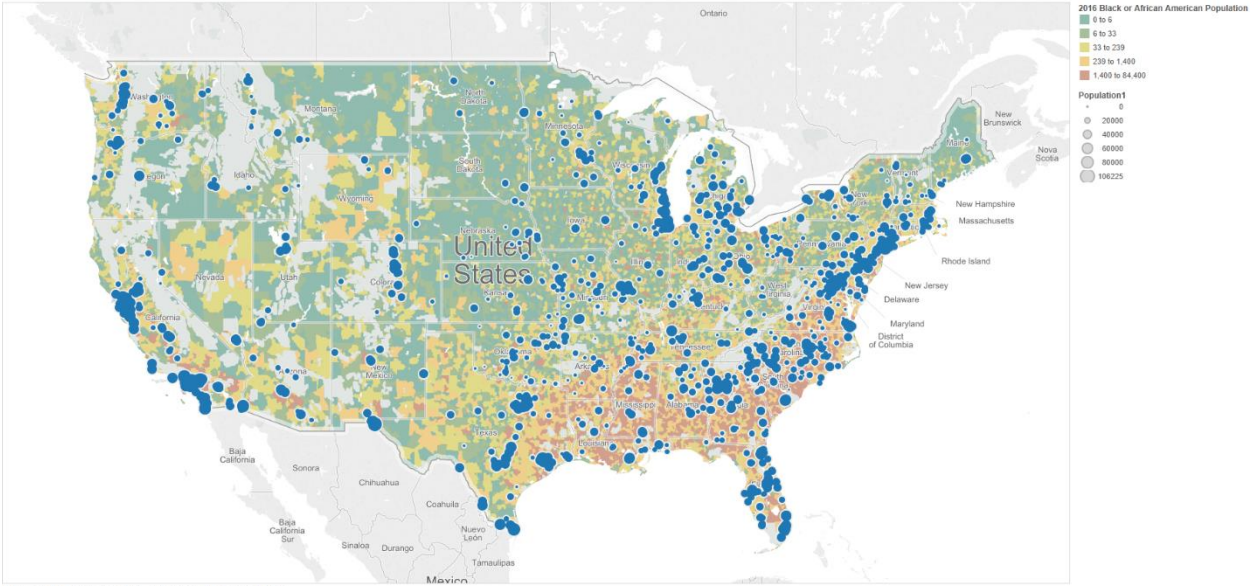


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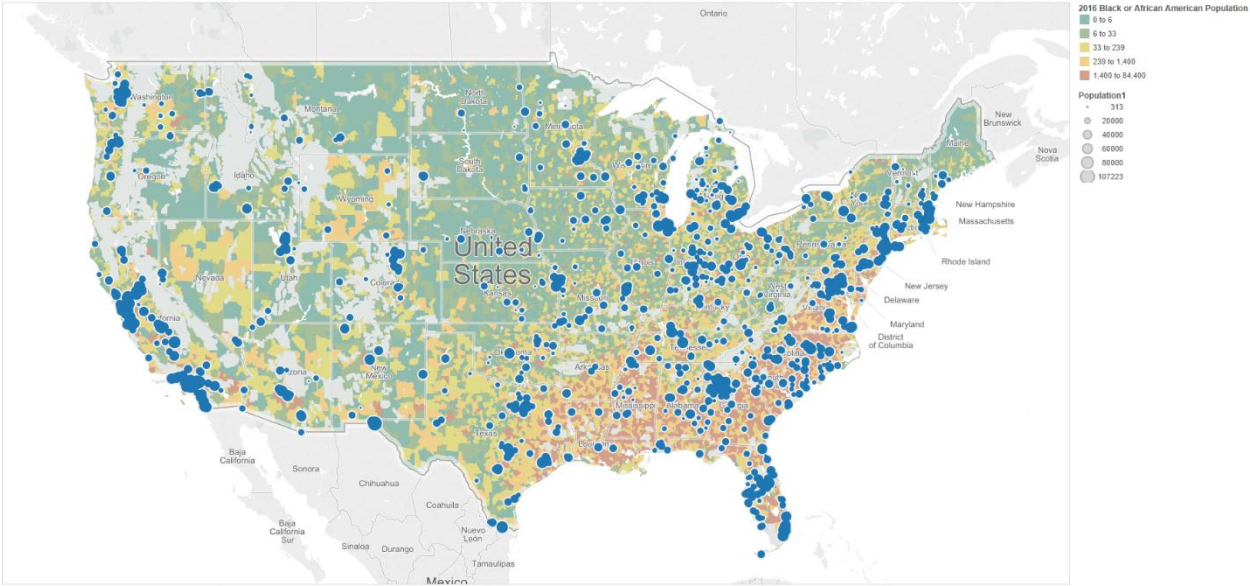


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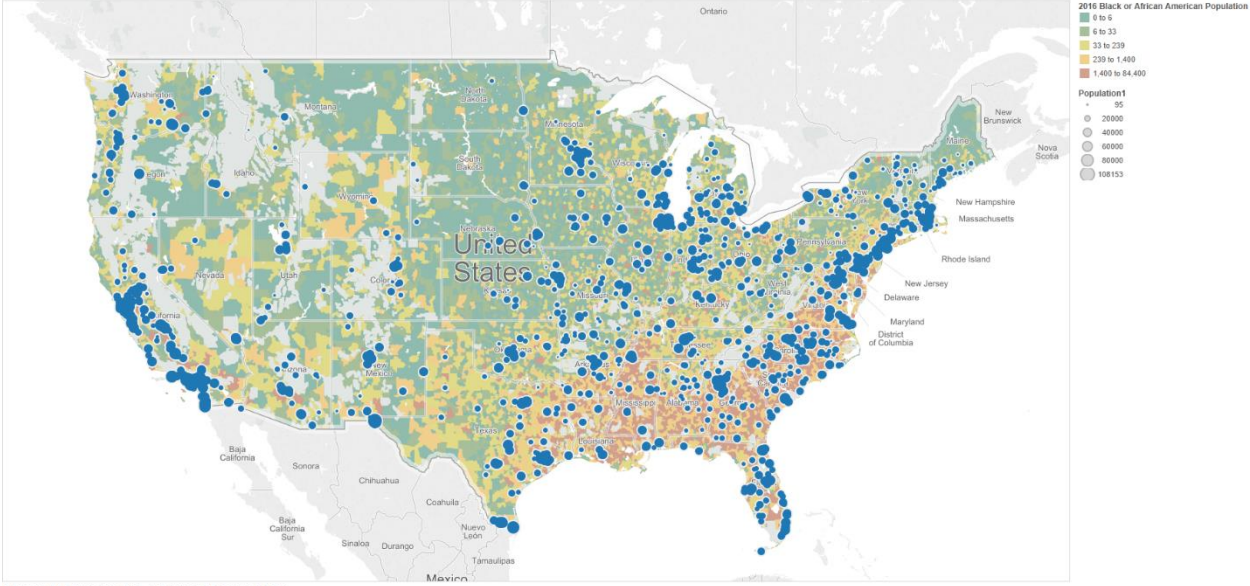


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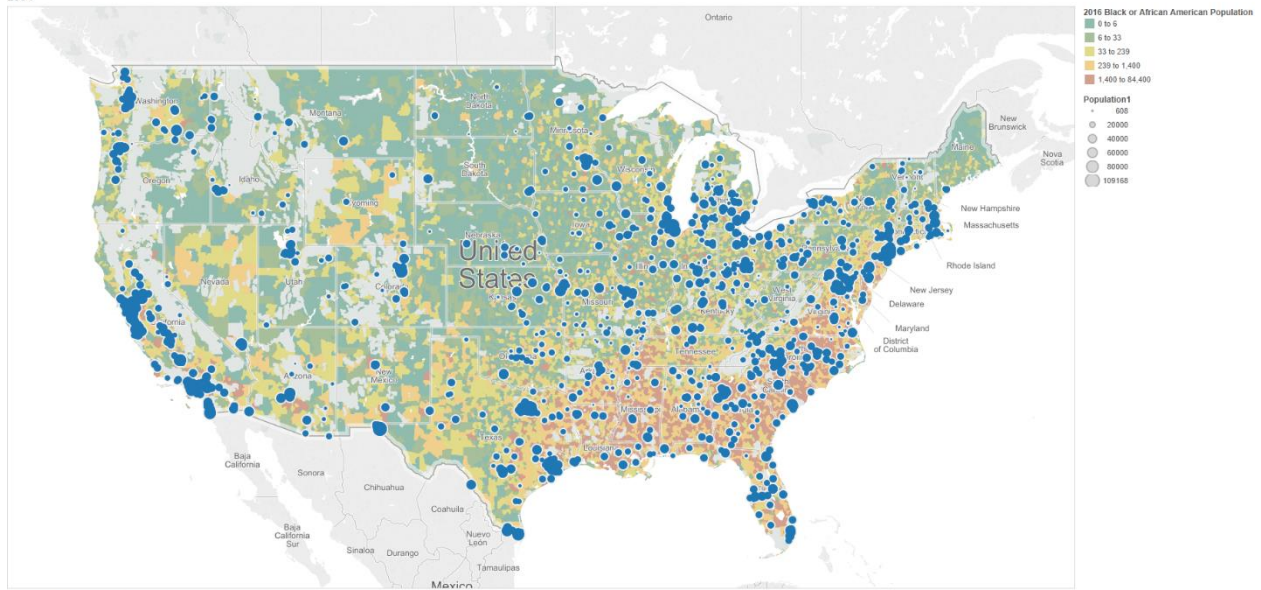


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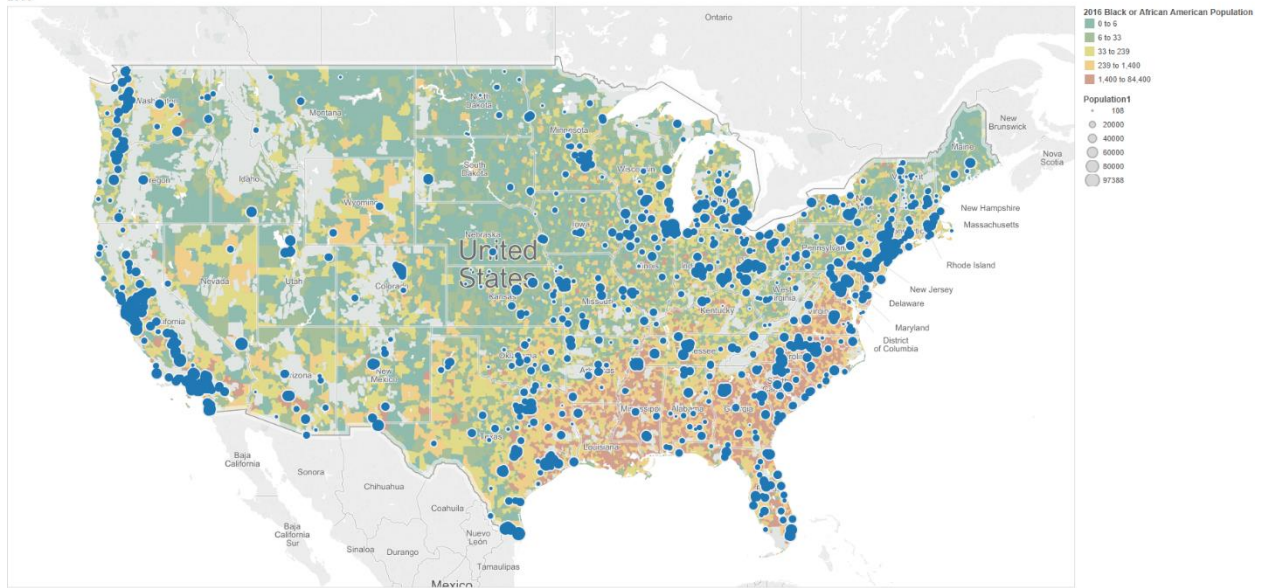


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2006

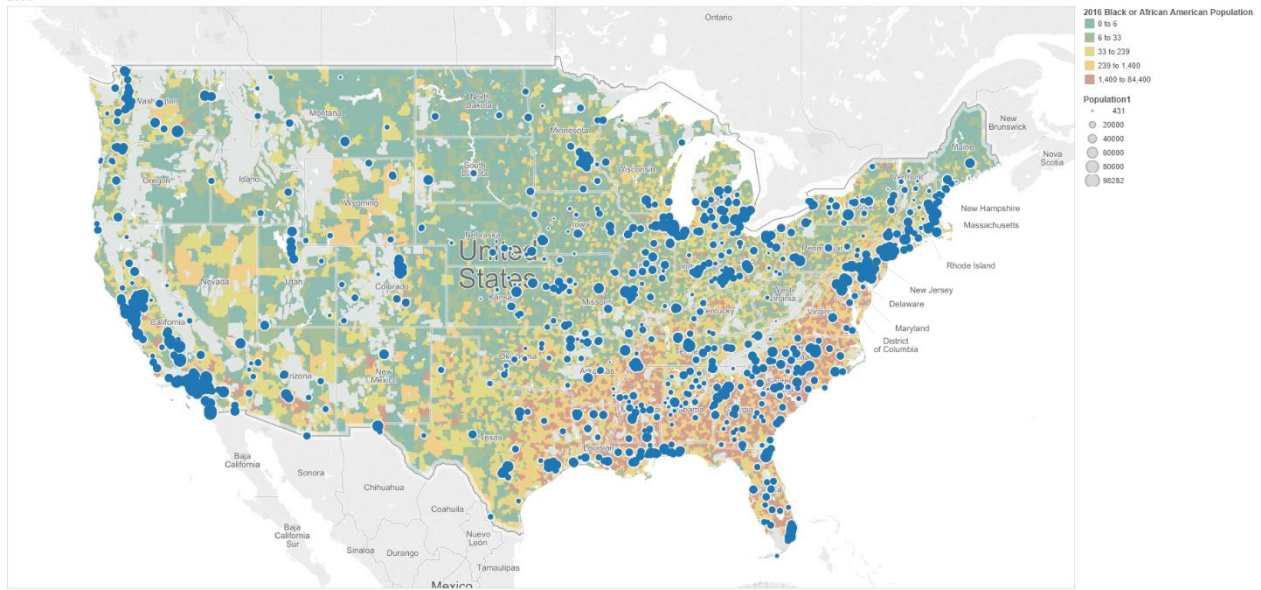


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2007

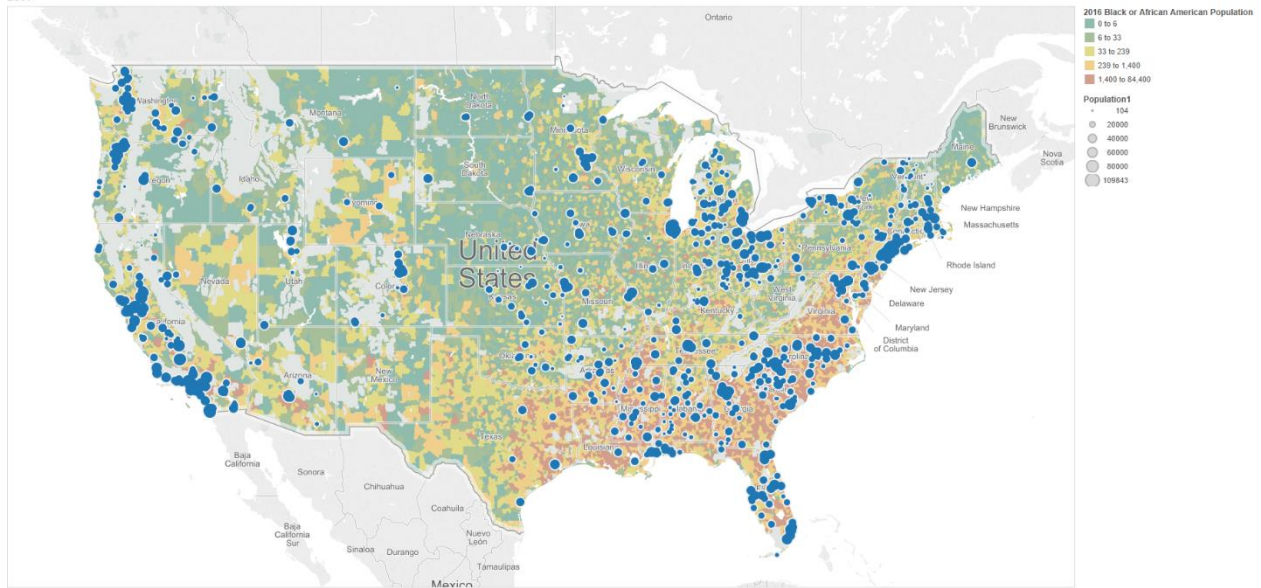


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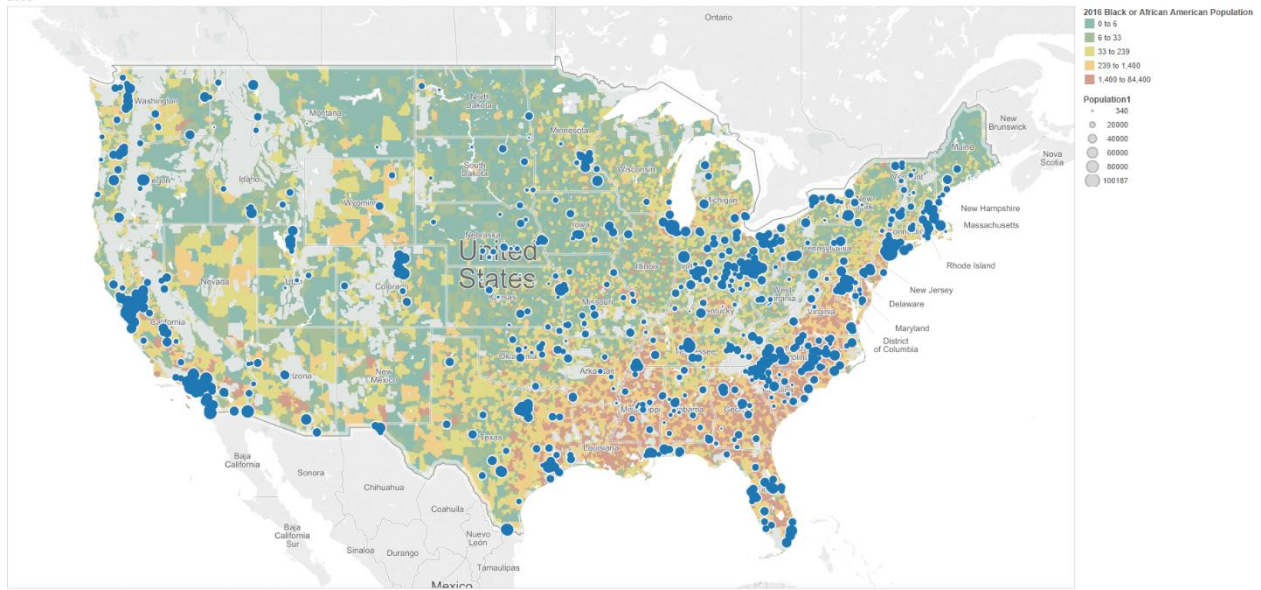


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2009

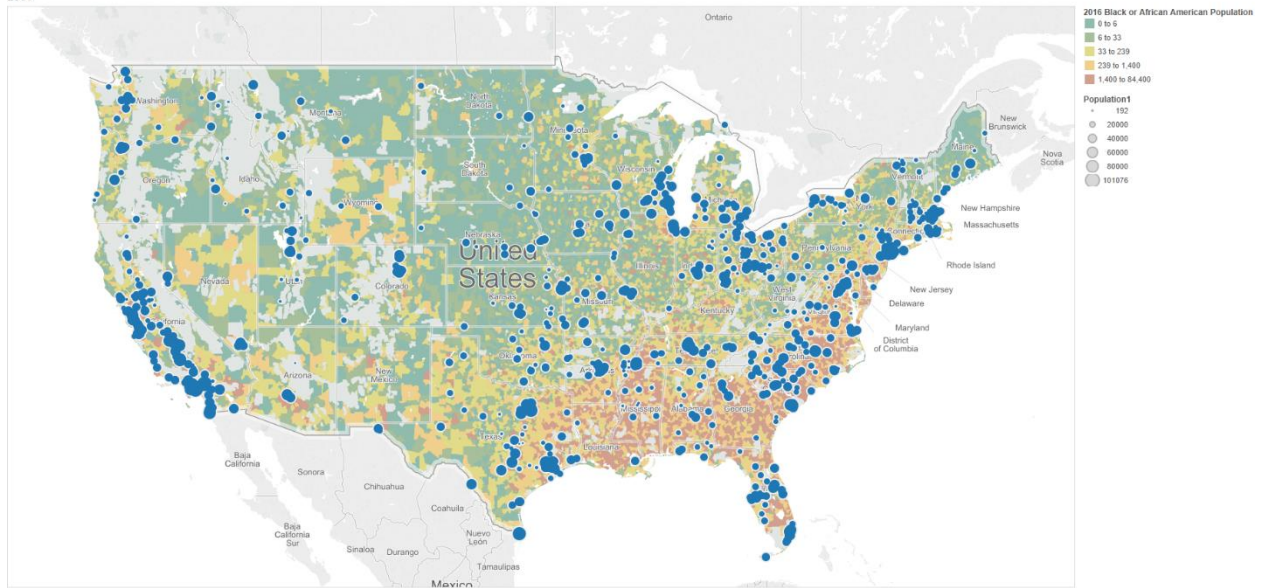


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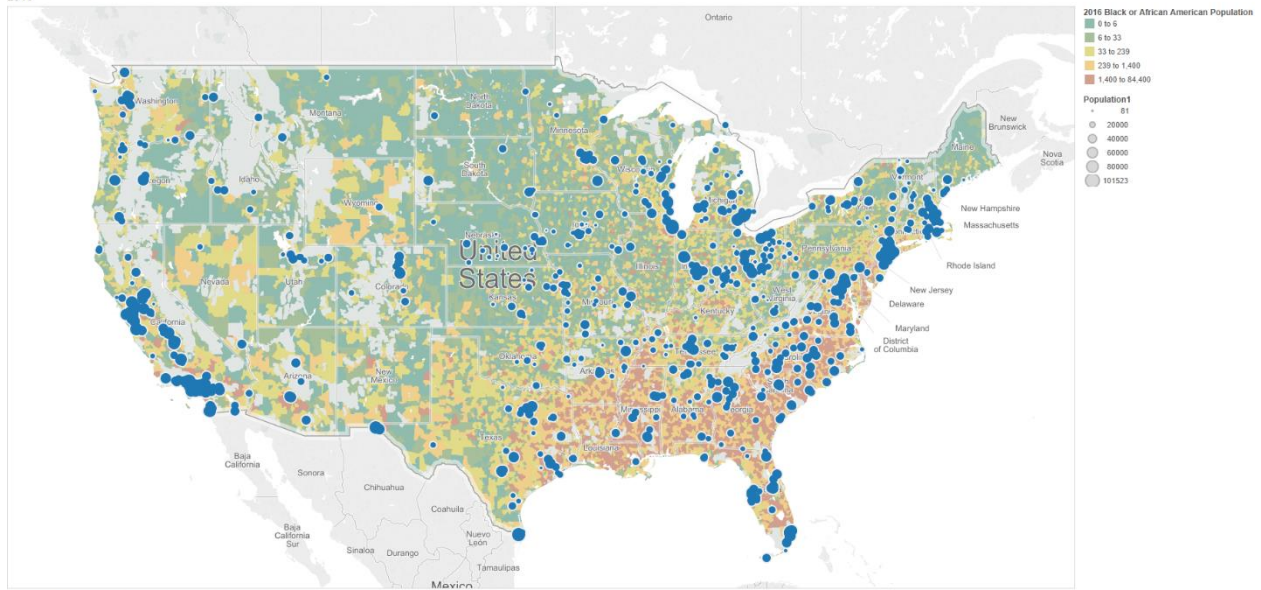


Figure 51

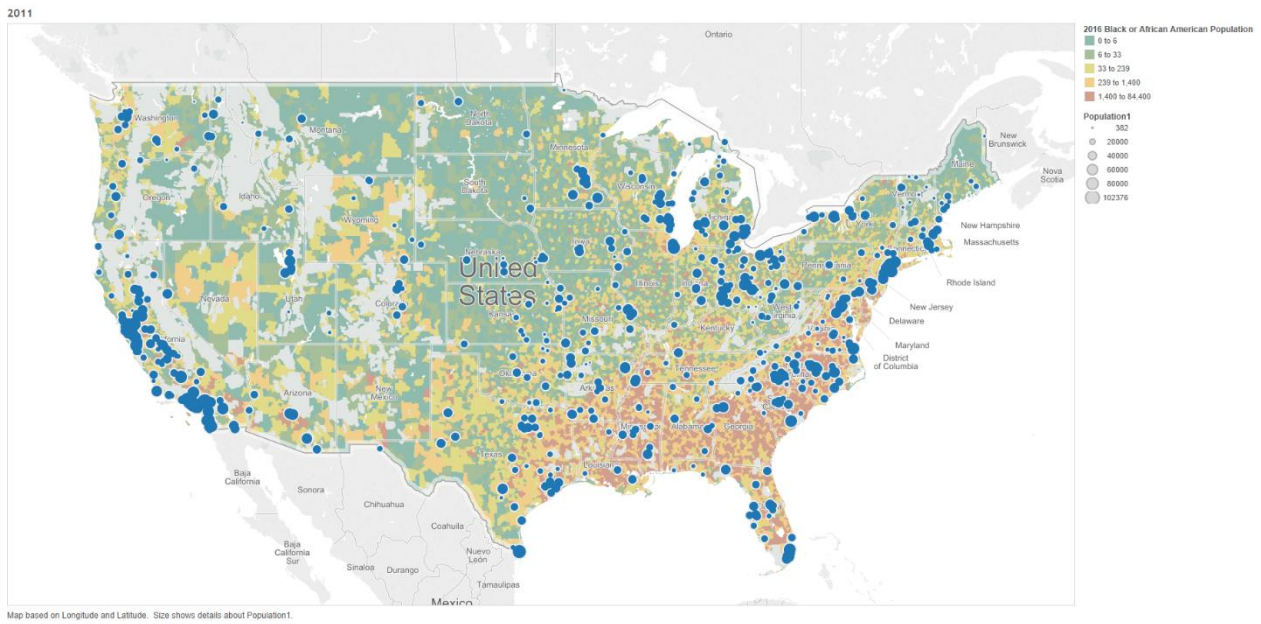


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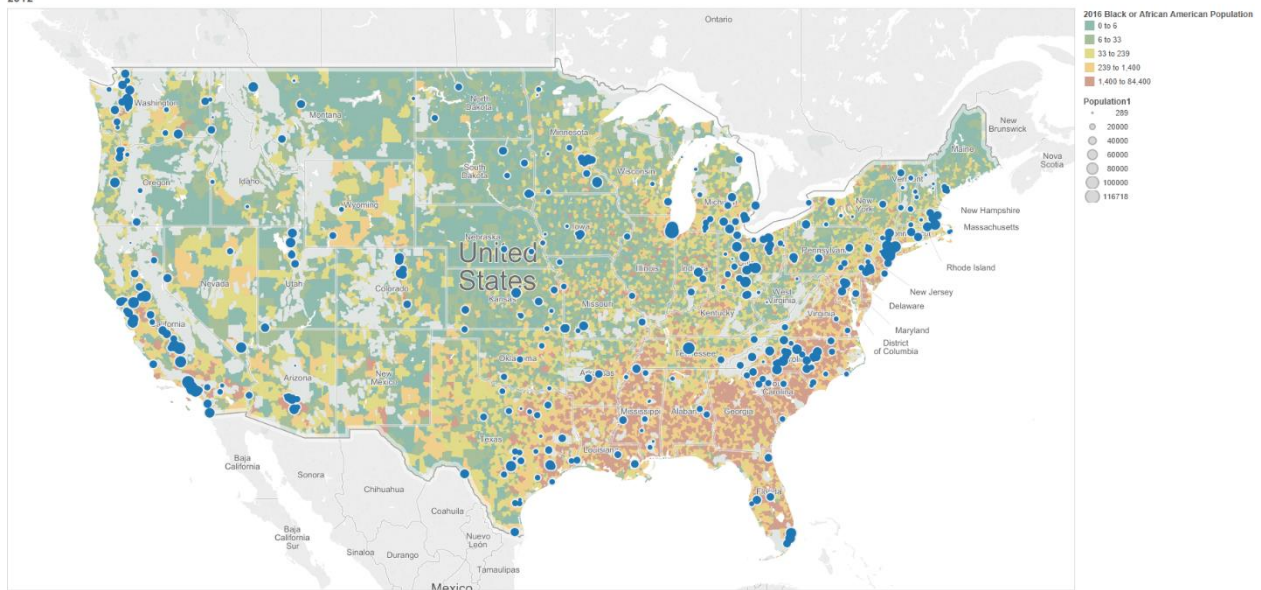


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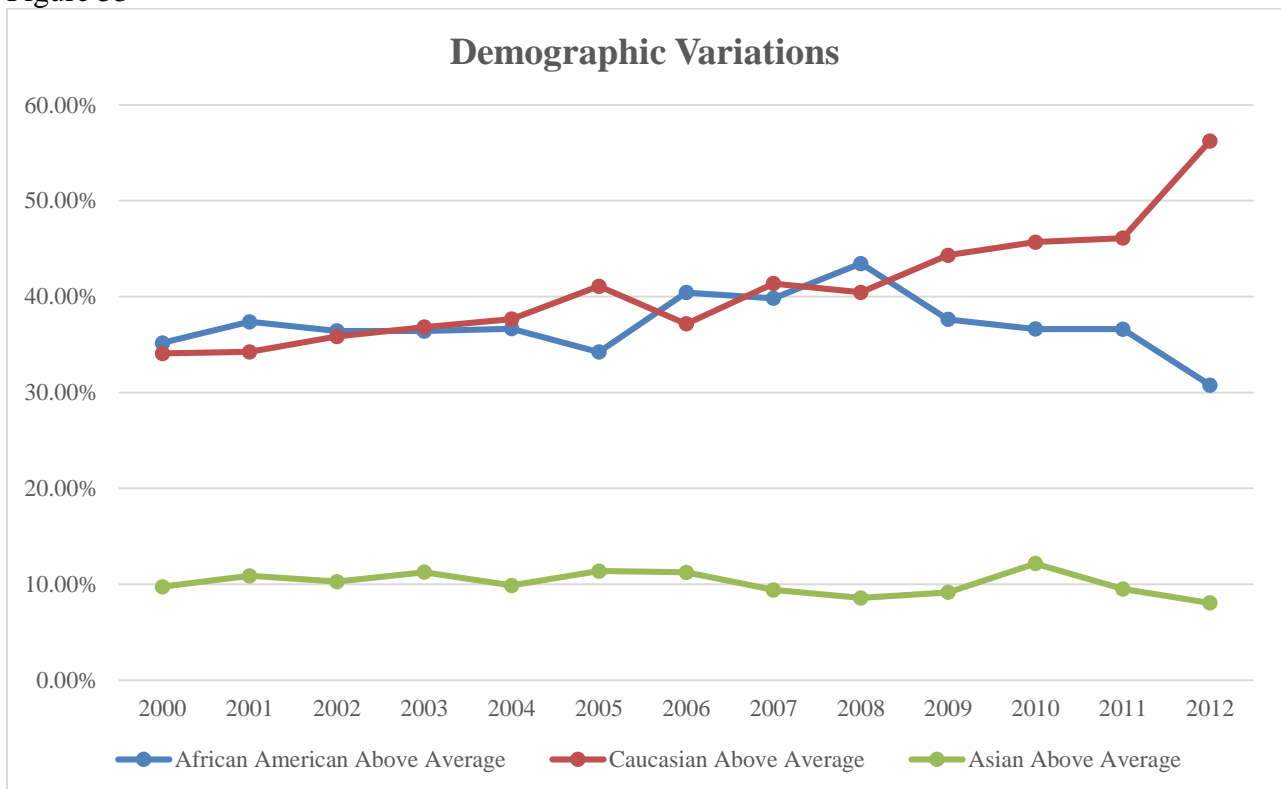


Figure 54

