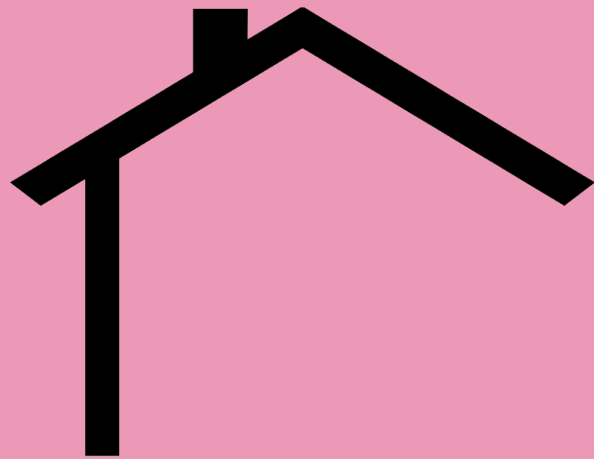# SAN FRANCISCO NEIGHBORHOODS MOST AFFECTED BY THE HOME MORTGAGE CRISIS
2007-2009

By Savannah Ryder
December 11th, 2017
Geographical Information Systems

INTRODUCTION

Background Summary

The San Francisco housing crisis is marked by a lack of affordable homes and apartments for middle and lower class families. These families are unable to afford the median cost of a home in the city, which is now sitting at a whopping $500,000. This is more than twice the national median home cost (Weinberger, 2016). This shortage of new homes is causing home mortgage prices to skyrocket. According to the National Low Income Housing Coalition, California counties including San Francisco County, continue to lead the nation in having the most expensive housing (Gutierrez, 2017).

San Francisco's income inequality and increased rate of homelessness is one of the major factors contributing this crisis (Smith, 2016). Because of this, the study will analyze which neighborhoods have been more affected by the home mortgage crisis. Factors that will be addressed in the map include, the average price of homes in each neighborhood and the down payment level required to get a home mortgage loan in these neighborhoods.

SUMMARY OF SCOPE

Research Question

Which San Francisco neighborhoods were most affected by the home mortgage crisis from 2007 to 2009?

More specifically, I want to see if those who couldn't afford to pay their home mortgage payments s are primarily located in certain areas or spread out evenly in neighborhoods across the city.

Hypothesis

I believe that the majority of areas affected by the home mortgage crisis will be in middle and lower class neighborhoods with greater ethnic diversity. I believe that these neighborhoods will be more affected since the people residing in them may not have adequate money in their savings to continue to pay the high mortgage rates they signed on for when they initially purchased their homes.

Limitations

Limitations in this study include the lack of availability of foreclosure data at the address level. While, the amount of foreclosures per census tract is available, the exact addresses of these foreclosure points are unavailable due to the need for privacy and anonymity of those affected. This limits the types of calculations that can be studied and makes a spaital join of the foreclosure points to the census tract polygons not possible. Additionally, the study will lack a statistical analysis to see whether there is a direct cause for the higher densities of foreclosures per household units in certain areas. Although it may interest many, we will be unable to see if the income levels of the residents in these areas where most of the foreclosures occurred are in trouble are actually lower than a level that would be expected to be able to finance a mortgage for the average price of home in that neighborhood. Finally, the study will not conduct an analysis of any neighboring cities and counties that may have had an effect on the home mortgage crisis in the San Francisco neighborhoods.

METHODOLOGY

Summary

The analysis will begin with downloading and adding each of the shapefiles listed below to arc GIS. Then I will download and clean the data from the United States Office of Policy Development and Research in excel to get only foreclosures within San Francisco County. Then I will input the excel data into the ArcMap project as a table. From there I will perform a table join by adding the foreclosure data to the attribute table of the census tracts layers in the ArcMap project. I will use the newly generated layer to calculate the density of foreclosures per household units and create the maps necessary to visually analyze which neighborhoods in San Francisco were most affected by the home-mortgage crisis.

Datasets Used

San Francisco Department of Planning
          -SF Find Neighborhoods 2006 [shapefile]
          -Census 2000: Tracts for San Francisco (no water) [shapefile]

United States Census Bureau
          -California Cartographic County Boundaries [shapefile]

United States Office of Policy Development and Research
          -California Foreclosure Data January 2007-June 2008
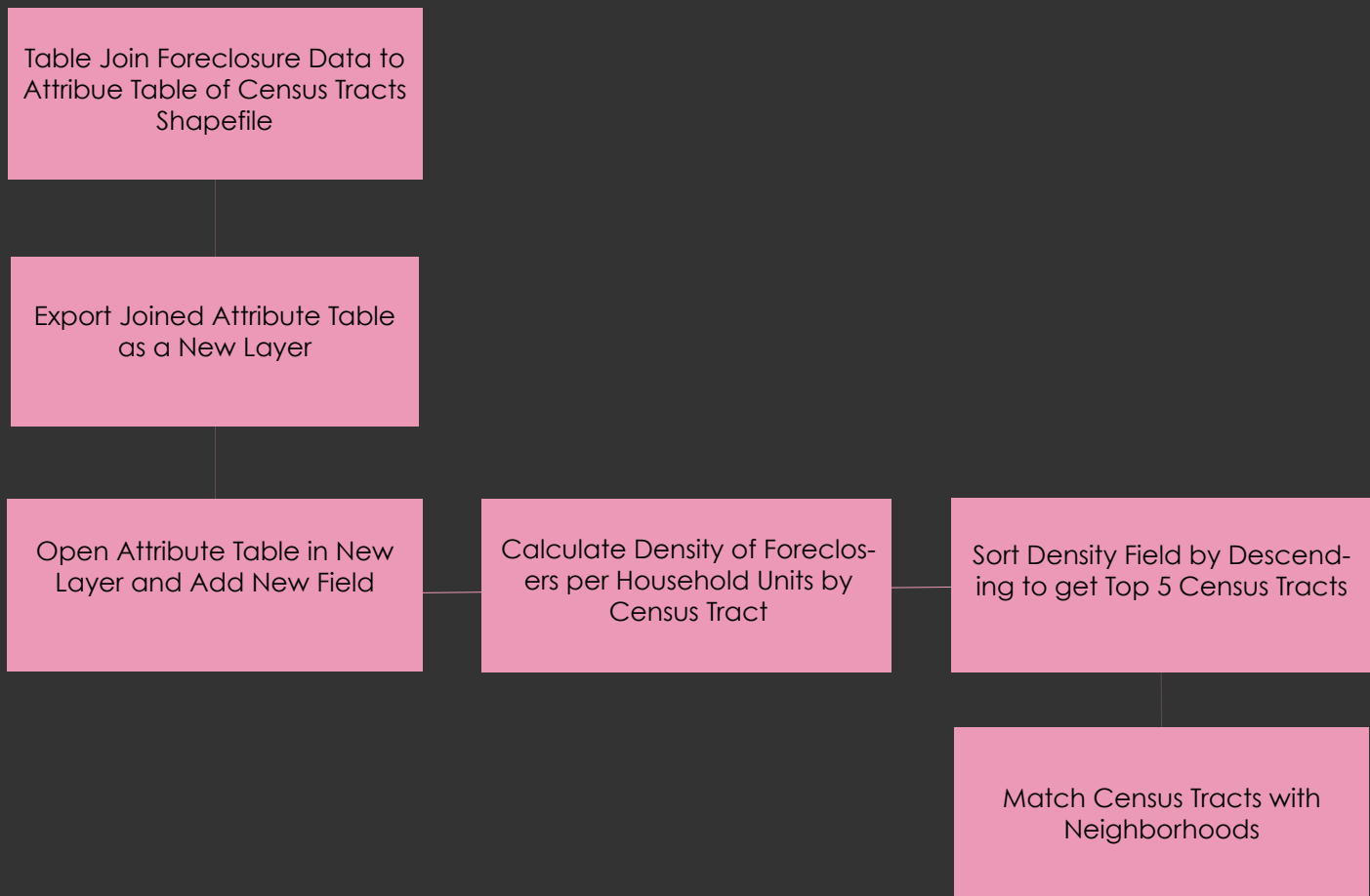
Assumptions

It will be assumed for the purposes of this study that the data from the Census 2000: Tracts for San Francisco represents the data for the census tracts of years 2007-2009. It will also be assumed that the SF Find Neighborhoods 2006 shapefile represents the neighborhoods during the years 2007-2009.

Constraints

Constraints of the study include the lack of foreclosure data from June 2008-December 2008. The study defines the study as taking place from the years 2007-2009, however, the data used in teh analysis only covers a year and a half of that time span.

METHODOLOGY

Table Join Foreclosure Data to Attribue Table of Census Tracts Shapefile

Export Joined Attribute Table as a New Layer

Open Attribute Table in New Layer and Add New Field

Calculate Density of Foreclosers per Household Units by Census Tract

Sort Density Field by Descending to get Top 5 Census Tracts

Match Census Tracts with Neighborhoods

Brief Overview of the Research Design

*Detailed Process to follow in Appendix A

STUDY LOCATION MAP
San Francisco
California

Oregon

San Francisco County

California

Nevada

Pacific Ocean

0   100 Miles
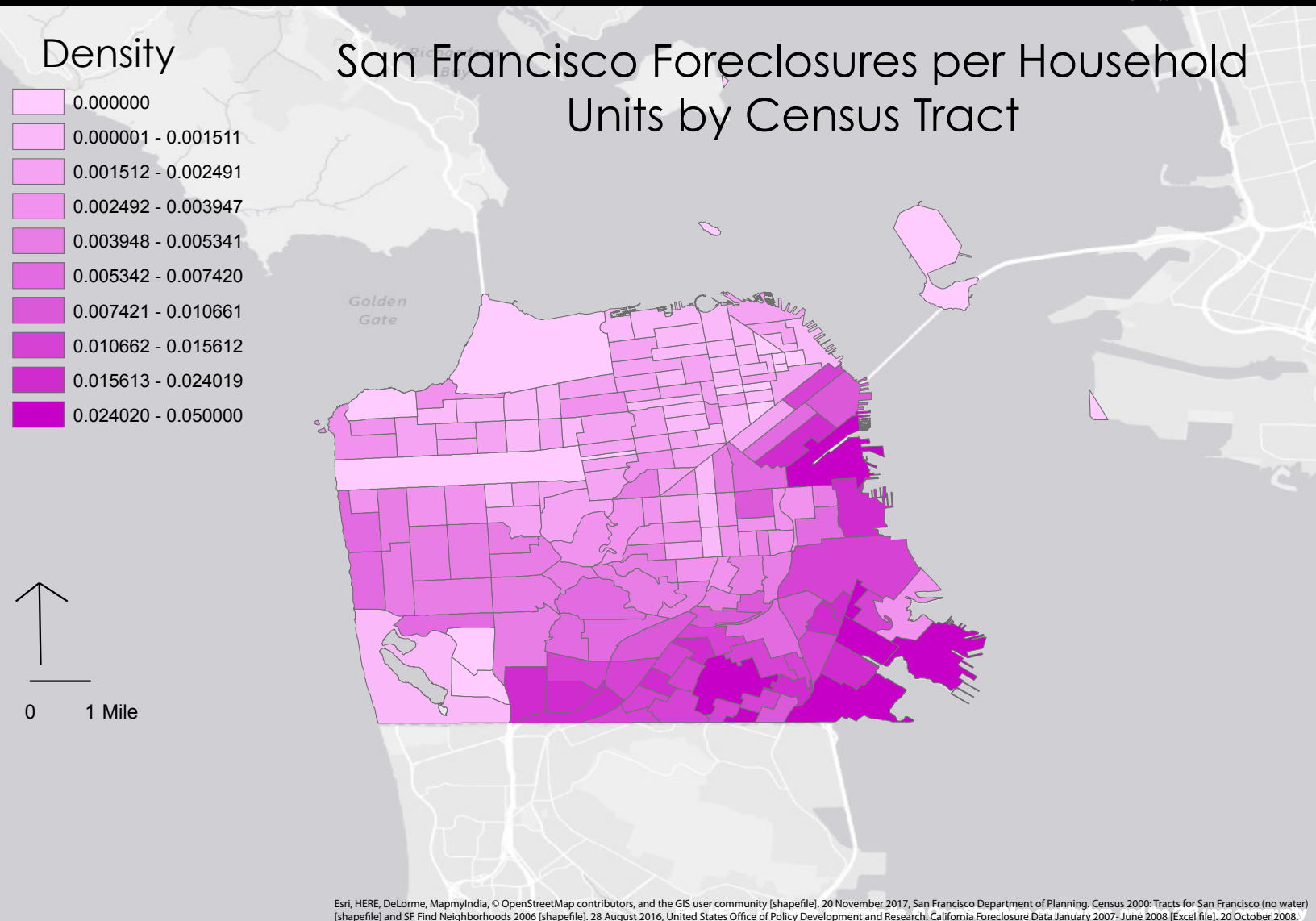
Figure 1: Map of San Francisco County relative to the State of California given for context.

Density Calculation Results

San Francisco Foreclosures per Household Units by Census Tract

Density

	0.000000
	0.000001 - 0.001511
	0.001512 - 0.002491
	0.002492 - 0.003947
	0.003948 - 0.005341
	0.005342 - 0.007420
	0.007421 - 0.010661
	0.010662 - 0.015612
	0.015613 - 0.024019
	0.024020 - 0.050000

0   1 Mile

San Francisco Neighborhoods with the Highest Density of Foreclosures

High ▮▮▮▮ Low

Mission Bay

San Francisco County

McLaren Park

Bayview

Hunters Point

Sunnydale   Visitacion Valley

0   1 Mile

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community [shapefile]. 20 November 2017, San Francisco Department of Planning. Census 2000: Tracts for San Francisco (no water) [shapefile] and SF Find Neighborhoods 2006 [shapefile]. 28 August 2016, United States Office of Policy Development and Research. California Foreclosure Data January 2007- June 2008 [Excel file]. 20 October 2008.

Figure 3: Map of San Francisco County's top 5 most dense neighborhoods in foreclosures per household units.

Top 5 Most Dense Neighborhoods (foreclosures/household units)

1. Hunters Point

2. Mission Bay

3. Bayview

4. McLaren Park

5. Sunnydale , Visitacion Valley

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FINDINGS

Answer to the Research Question

The answer to the research question: ***Which San Francisco neighborhoods were most affected by the home-mortgage crisis of 2007-2009***, is outlined by the map on page 8 (figure 3) and also listed below for your reference.

1. **Hunters Point (0.05** foreclosures/household units**)**
2. **Mission Bay (0.03617** foreclosures/household units**)**
3. **Bayview (0.033333** foreclosures/household units**)**
4. **McLaren Park (0.033097** foreclosures/household units**)**
5. **Sunnydale/Visitacion Valley (0.03263** foreclosures/household units**)**

It turns out that the neighborhood with the highest density of foreclosures per household unit was Hunters Point with a density of 0.05. This was followed by the Mission Bay neighborhood with a density of 0.03617, then the the Bayview neighborhood at 0.033333, McLaren park at 0.033097, and finally Sunnydale/Visitacion Valley at 0.03263.

Limitation of Findings

The limitation of this finding was that the census tracts didn't always match up evenly within a neighborhood boundary. In some cases, like the case of census tract 026404. According to the data taken from the City of San Francisco, this tract spanned across two neighborhoods, which in this case was both Sunnydale neighborhood and Visitacion Valley neighborhood.

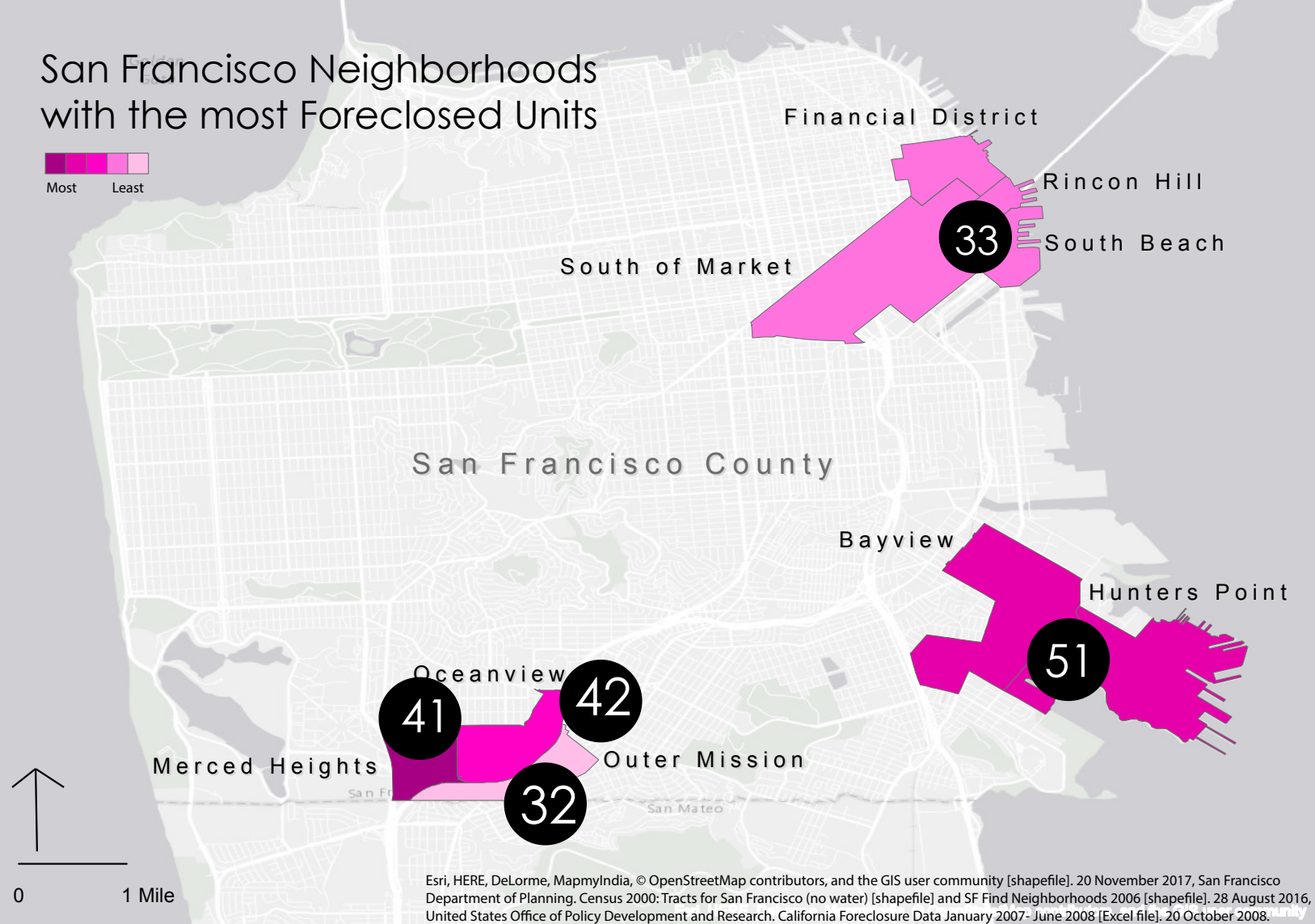# San Francisco Neighborhoods
with the most Foreclosed Units

Most Least

Financial District

Rincon Hill

South Beach

South of Market

33

San Francisco County

Bayview

Hunters Point

51

Oceanview

42

41

Merced Heights

Outer Mission

32

0   1 Mile

Figure 4: Map of San Francisco County's neighborhoods with the most foreclosured units.

Top 5 Neighborhoods
Most Foreclosures
Regardless of the Number of Household Units

1. Merced Heights

2. Hunters Point, Bayview

3. Oceanview

4. South of Market,Financial District, Rincon Hill, South Beach

5. Outer Mission

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COMPARISON

Is Density More Accurate?

After completing my density calculation of foreclosed units per household units in each census tract, I was curious if the census tracts with the highest densities were the same as the census tracts with the highest number of foreclosures.

My findings, as displayed in the map on page 10 (figure 4), indicate that while certain neighborhoods were the same, others were different.

The top 5 neighborhoods with the most foreclosed units regardless of the overall number of household units in the neighborhood and their foreclosure numbers were:

1. **Merced Heights   (51** forecosed units**)**
2. **Hunters Point, Bayview (42** foreclosed units**)**
3. **Oceanview (41** foreclosed units**)**
4. **South of Market,Financial District, Rincon Hill, South Beach (33** foreclosed units**)**
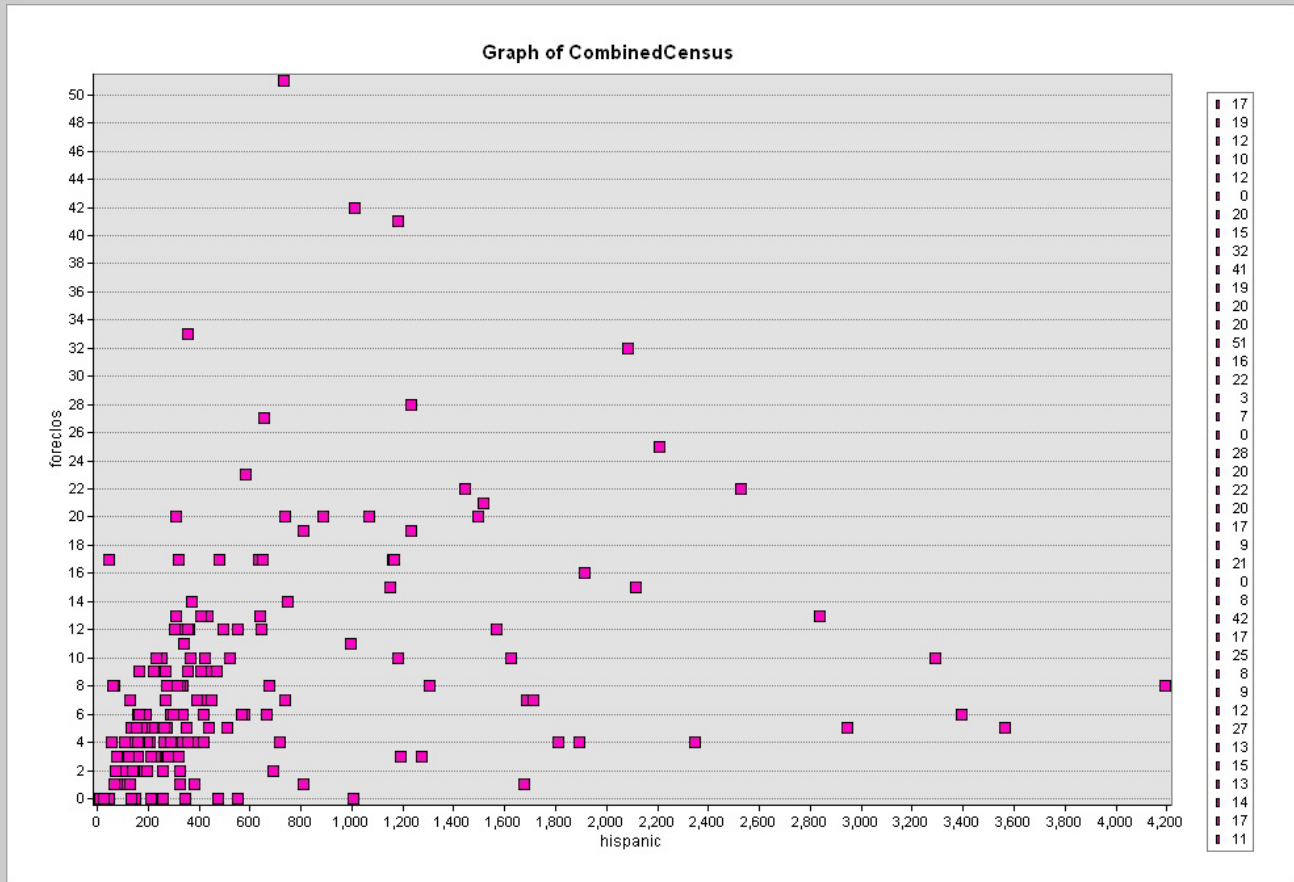5. **Outer Mission (32** foreclosed units**)**

When comparing this finding for the highest number of foreclosed units to the highest density of foreclosures per household unit, one can see that the density calculation is more accurate since it takes into account the overall number of household units in a census tract. For example, while Merced Heights had the most number of foreclosures between 2007 and 2009, its density was not in the top 5 at 0.019488. This is because Merced Heights is a very large neighborhood that consisted of 2,617 household units during the time frame of this study.

So using density to obtain the answer as to which San Francisco neighborhoods were most affected by the home mortgage crisis of 2007-2009 faired as a much more accurate basis than simply looking up the number of foreclosures per census tract and matching them with neighborhooods.

Limitation of Secondary Findings

Again, the same issue occurred with this finding. The census tracts containing the highest foreclosure numbers didn't always match up evenly within a neighborhood boundary. In this case, census tract 023200 was a part of both the Hunters Point and Bayview neighborhood and census tract 017901 crossed four different neighborhoods (South of Market, Financial District, Rincon Hill, and South Beach.

ETHNICITY

Figure 5: Scatterplot that shows the amount of hispanic people in a census tract in relation to the amount of foreclosured units.

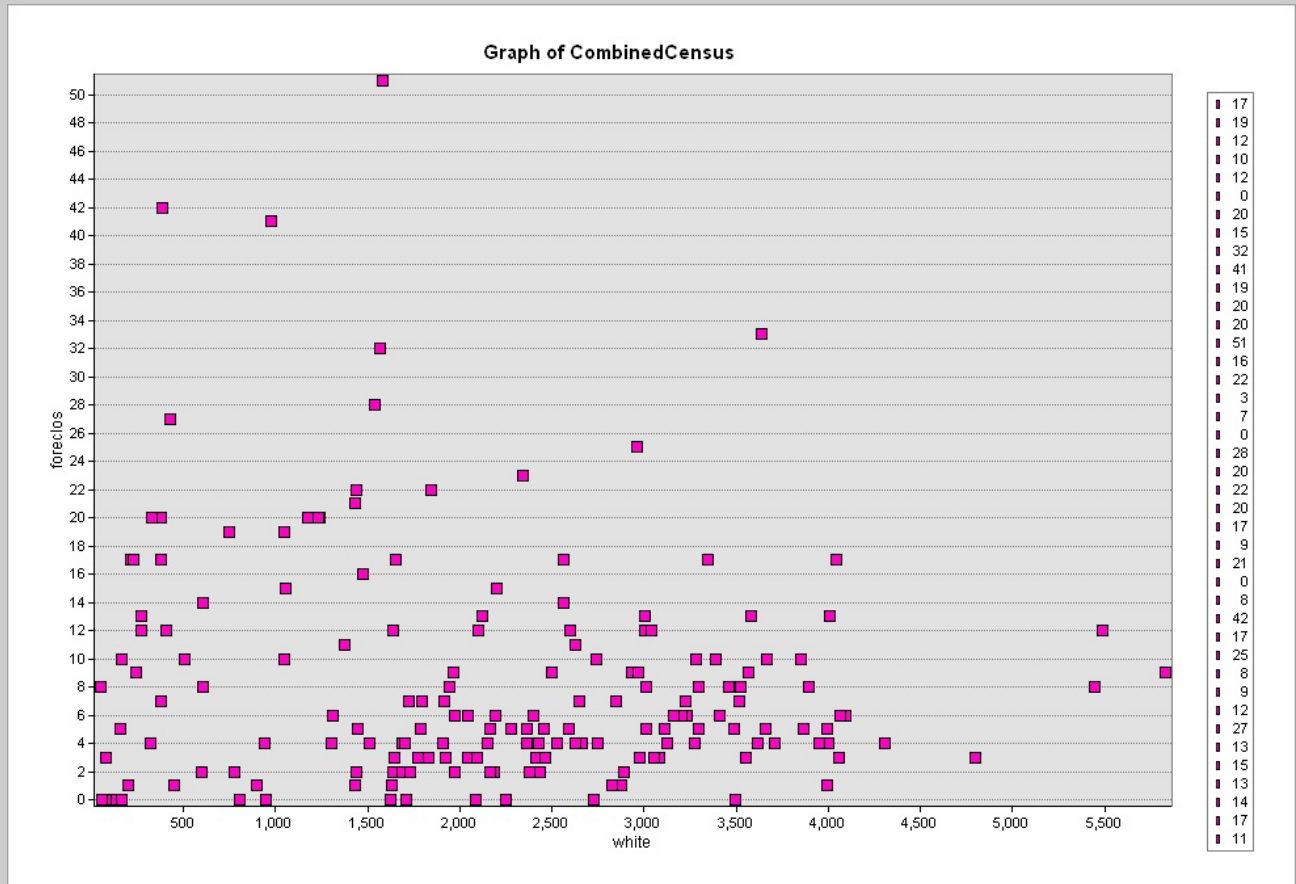## A Look at Race and Foreclosure

Since the density findings did not indicate whether or not certain races were more subject to be living in neighborhoods with more foreclosures between 2007-2009, I I created 4 scatterplots on ArcMap using the graph function and columns from the combined census attribute table to display this information in Figures 5, 6, 7, and 8 on the following pages.

Hispanic Population

In figure 5, shown above, the hispanic population is plotted in correlation with the number of foreclosed units per census tract. Hispanics were largely clustered toward the right side of the plot. This demonstrated that overall there is a small population of hispanic people living within the county's census tracts.
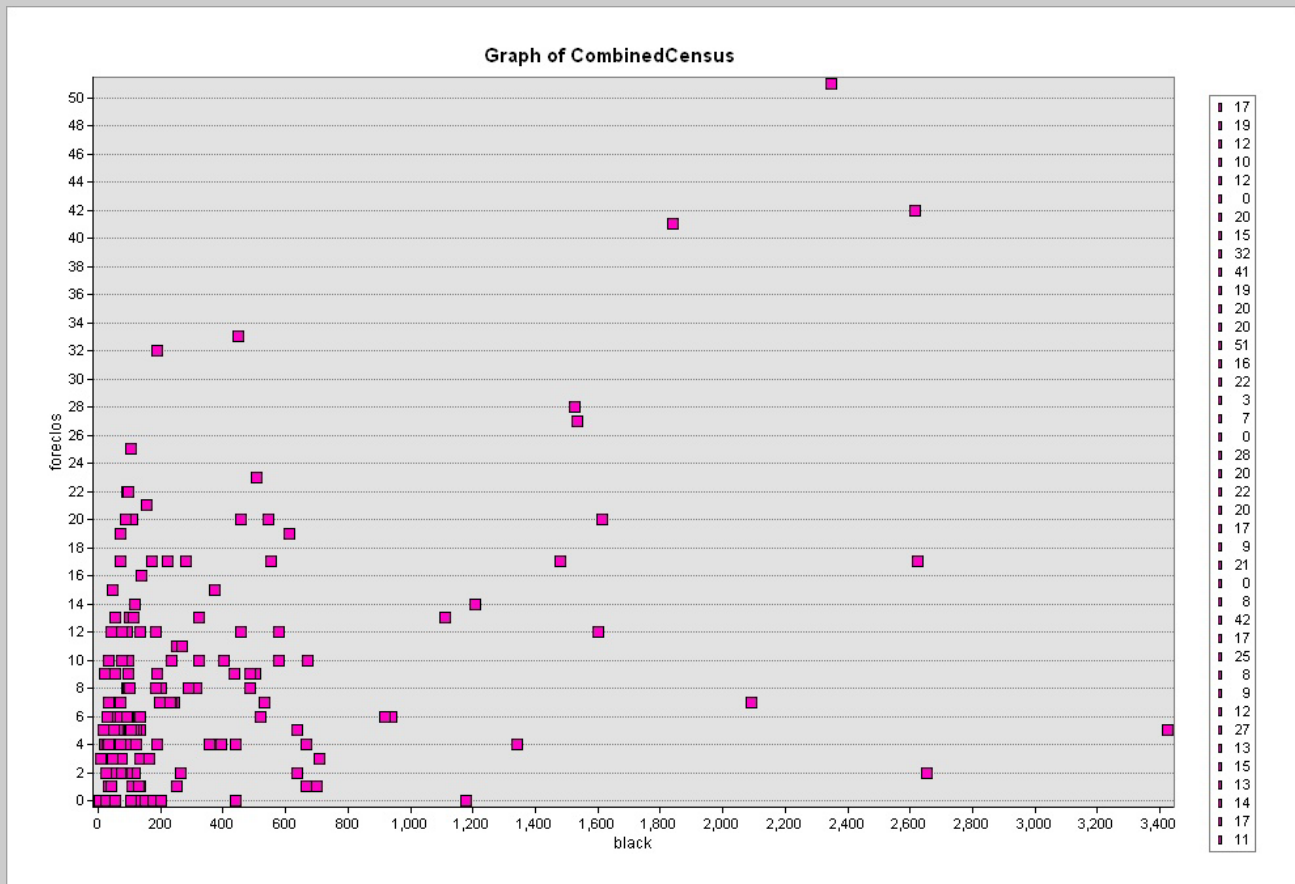
ETHNICITY

Figure 6: Scatterplot that shows the amount of white people in a census tract in relation to the amount of foreclosured units.

White Population

In figure 6, shown above, the white population is plotted in correlation with the number of foreclosed units per census tract. In comparison to the other races I plotted, the white population appeared to be the most evenly spread out.

Figure 7: Scatterplot that shows the amount of black people in a census tract in relation to the amount of foreclosured units.
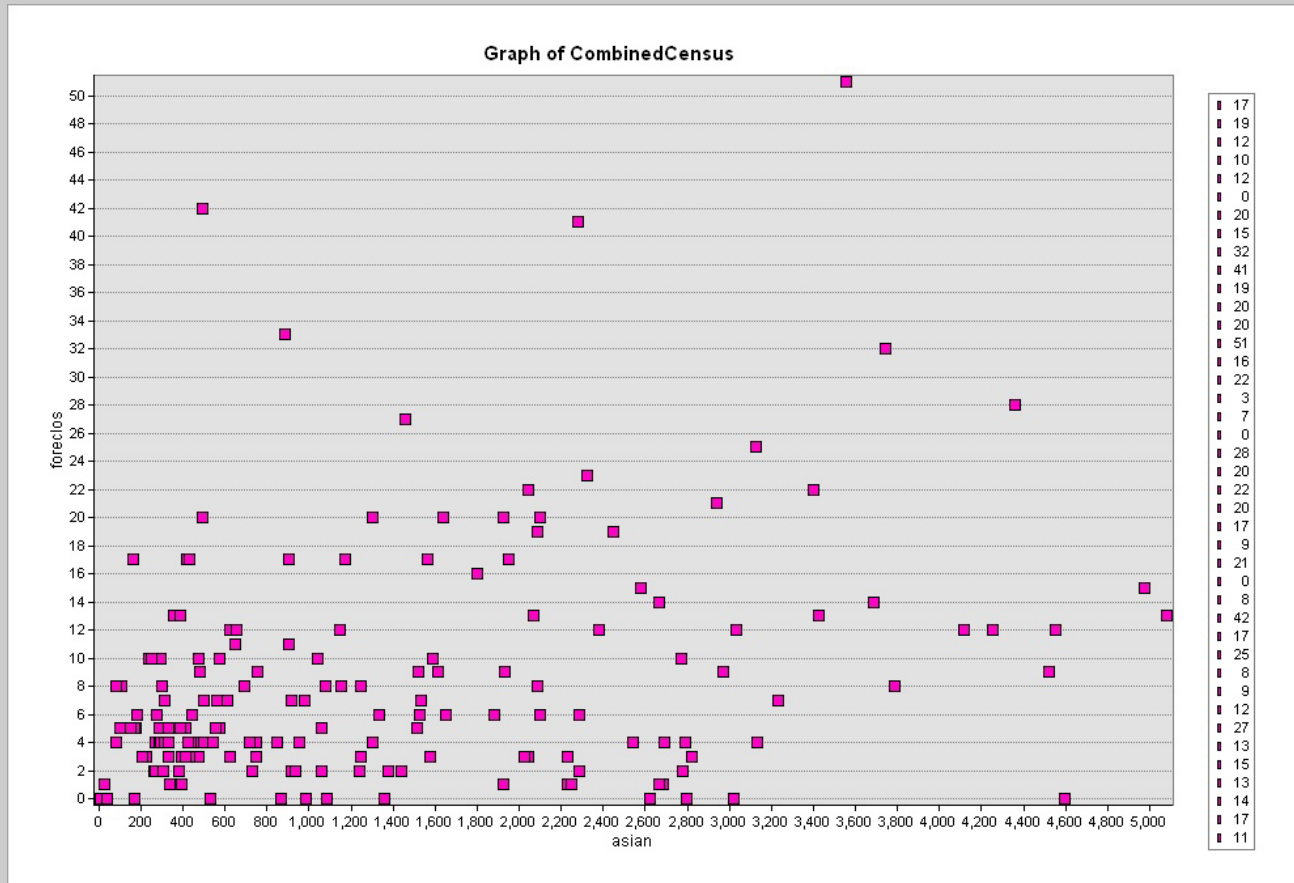
Black Population

In figure 7, shown above, the black population is plotted in correlation with the number of foreclosed units per census tract. In comparison to the other races plotted, black population was the most clustered to the left side of the plot,

This demonstrated that overall there is a small population of black people living within the county's census tracts.

Figure 8: Scatterplot that shows the amount of asian people in a census tract in relation to the amount of foreclosured units.

Asian Population

In figure 8, listed above, the asian population is plotted in correlation with the number of foreclosed units per census tract. Of the four populations plotted, the asian population was most similar to the white population in that the amount of asian people living in San Francisco County tended to be evenly dispersed across the census tracts regardless of foreclosures.

IMPLICATIONS

Implications

Overall, it is evident that certain areas and neighborhoods within the city if San Francisco faced foreclosure to a higher degree than others. Within those neighborhoods, certain ethnicities were more prone to foreclosure than others, indicating that a need for more affordable housing in a mixed-use context could be an appropriate action to take to help evenly disperse residents and place them in living quarters across the city.

New Development

After completing my GIS mapping analysis and finding that the neighborhood Mission Bay had the 2nd most dense amount of foreclosures per household units, I was immediately intrigued. I am familiar with that neighborhood being the new home to UCSF's brand new medical center and accompanying academic campus. These three new hospitals include the Bakar Cancer Hospital, the Betty Irene Moore Women's Hospital, and Benioff Children's Hospital. I wondered if the recent foreclosures in the Mission Bay neighborhood had anything to do with this development, which was completed in February of 2015.

After some more research, I was able to find directly from the City of San Francisco, details on a master plan for the Mission Bay Neighborhood. It turns out that the city is concetrating a huge effort into turning this once old rail yard into a center for education and innovation alongside the building of new mixed housing units and a new transit hub. The development is anticpated to help economic growth in the community by providing 30,000 new jobs in the fields of biotech, healthcare, technology, and education ("Mission Bay", 2016).

The *Mission Bay Project*, is actually a public/private partnership between the Mission Bay Development Group and the City of San Francisco's Redevelopment Agency. The 303 acre neighborhood began its redevelopment in 2000, but isn't expected to reach full completion until the year 2020 when it will be home to 11,000 new residents ("Mission Bay", 2016). Upon its completion, the development will encompass all of the following:

-6,400 housing units (4,500 market-rate and 1,900+ affordable)
-3.4 million square feet of commercial office space
-3.15 million square feet of UCSF reserach buildings
-550 bed UCSF Medical Center on 14.5 acres
-250 room hotel
-a new school, police station, library
-49+ acres of parks and open space

DEVELOPMENT OF UCSF MISSION BAY

The University of California, San Francisco opened a new academic campus and 3 new hospital campuses on February 1st, 2015 as a part of the comprehensive Mission Bay Plan. This was just **7 years** after Mission Bay neighborhood had the 2nd most amount of foreclosures per household units in San Francisco County.

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APPENDIX A

Step by Step Methodology

1. Download all shapefiles and datasets from the internet.

2. Clean United States Office of Policy Development and Research Foreclosure Data.

    a. Delete all columns except census tract and foreclosures.

    b. Separate out San Francisco County Census Tracts from the rest of California.

3. Create an ArcMap project.

4. Add the Neighborhood Boundary, Census Tract Boundary, and County Boundary shapefiles to the ArcMap project.

5. Add the Excel Foreclosure data to the ArcMap project.

6. Perform a table join to link the excel data to the attribute table for 2000 census tracts using census tract number as the link.

    a. Export this joined table as a new layer and add it to the ArcMap project.

    b. In new Joined attribute table add a field and label it "Density".

    c. Using the Field Calculator tool, take the column of foreclosures per census tract and divide it by the column for household units per census tract.

    d. Sort the Density column by "Descending" to see which census tracts have the highest density of froeclosures per household units.

7. Using the SF Find Neighborhoods shaprefile look up what neighborhood each census tract lies within the bounds of.