



Regional Early Warning System for Displacement *Typologies Final Project Report*

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Introduction

As regions across California plan for and invest in transit oriented development (TOD), in part as a response to SB 375 and the implementation of their Sustainable Communities Strategies, communities are increasingly concerned about how new transit investment and related new development will affect the lives of existing residents, particularly low-income communities of color. Locals are likely to benefit from improved mobility, neighborhood revitalization, lower transportation costs, and other amenities that spill over from the new development (Cervero 2004). However, more disadvantaged communities may fail to benefit if the new development does not bring appropriate housing and job opportunities, or if there is gentrification that displaces low-income and/or minority residents (Chapple 2009; Pollack, Bluestone, and Billingham 2010).

The Regional Early Warning System for Displacement (REWS) is a project of the Center for Community Innovation at UC Berkeley that is supported by the Bay Area Regional Prosperity Plan and the California Air Resources Board. The REWS involves extensive qualitative and quantitative regional analysis to better understand the nature of neighborhood change and displacement in the Bay Area and its relationship to TOD. This report presents the results of the typology analysis that characterizes Bay Area neighborhoods (census tracts) according to their experience and risk of displacement. Through this analysis a number of factors have been related to the processes of gentrification and displacement¹ including the nature of a neighborhood's existing housing stock (% of prewar buildings), its proximity to jobs and rail transit, as well as changes that may provide early signs of displacement such as the loss of market rate affordable housing units, housing price appreciation, and market rate development in an area. This analysis combines this information on early signs of displacement and gentrification with information of the current and past transformations of neighborhoods to paint a comprehensive picture of the extent and nature of displacement in the Bay Area.

From this analysis we find that nearly half of Bay Area census tracts are undergoing some form of neighborhood transformation and displacement. Although the process of gentrification receives the most attention, it accounts for less than half of the tracts that experienced some form of displacement between 2000 and 2013. Because of current housing and development trends, the number of tracts at risk of displacement is nearly double the number that has already experienced it, indicating that the

¹ There is much discussion and debate around the relationship between gentrification and displacement. For the purposes of this analysis, we treat them as related yet distinct processes. Whereas gentrification characterizes class and real estate transformations of low income neighborhoods that often involves the displacement of low income residents, displacement of low income residents can occur in both high and low income neighborhoods.



transformation the Bay Area has been witnessing may only be a start². Below we summarize the methodology used, typologies identified and the results of the analysis. A more complete description of the methodology and data analysis is included in the Appendix.

Methodology

Over 50 variables were analyzed from 1990-2013 from various datasets including data on demographics, transportation, housing, land use, and policies. The Center for Community Innovation (CCI) developed a gentrification index adapting the methodologies of various researchers (e.g., Freeman 2005; Bates 2013; Maciag 2015) to characterize places that historically housed vulnerable populations and experienced significant demographic shifts and investment in real estate. See the appendix for the methods used to develop the gentrification index.

The loss of low income households was used to proxy for displacement. Researchers have found that neighborhood composition in the United States is considerably stable (Wei and Knox 2014; Landis 2015). In fact, and as will be shown in the next section, on average low income populations in Bay Area census tracts grew by 59 households between 2000 and 2013. Therefore, we assume that any neighborhood that experienced a net loss of low income households while stable in overall population is a result of displacement pressures. Although the change in low income households could be due to income mobility (e.g., low income households moving into middle or upper income categories, or vice versa), from our analysis of data from the Panel Study on Income Dynamics we estimate that there would have been a net increase in low income households in most places likely due to the Great Recession, therefore our estimates of displacement are likely an underestimate if anything.

Robust regression models were constructed to estimate the predictors of both gentrification and loss of low-income households/displacement, which were then incorporated into place typologies for risk of either gentrification-related displacement or exclusion-related displacement which occurs in higher income neighborhoods (Goetz, Damiano, and Hicks 2015).

Displacement typologies were reviewed by the REWS project advisory committee and were compared against the REWS case study results. Feedback was gathered from several forums and incorporated into the final classification system.

Gentrification and Displacement Typologies

Tracts were first divided into two groups based on the share of low income households in the tract. Low income was defined as households that had an income below 80% of the County median. Tracts were then classified as being lower income if their share of low income households was greater than the Bay Area regional median in 2013 (39%) and higher income if their share was below the regional median. Once categorized as either lower or higher income, tracts were divided into 4 categories: a) not losing low income households or very early stages of displacement, b) at immediate risk of displacement, c)

² It is important to note that this analysis does not capture more recent trends from 2013 to 2015, which has witnessed a rapid acceleration of the real estate market. Therefore the results presented here are likely underestimates of the current experience and risk of displacement.



undergoing displacement, and d) advanced stages (Table 1). Please see the Appendix for the methodologies used to develop these typologies and the specific variables that were analyzed.

Table 1 Displacement/Gentrification Typologies¹

Lower Income Tracts (> 39% of HH are considered Low Income)	Moderate to High Income Tracts (<39% of HH are considered Low Income)
<p>Not losing low income households or very early stages</p> <ul style="list-style-type: none"> Does not fall within any of the below categories 	<p>Not losing low income households or very early stages</p> <ul style="list-style-type: none"> Does not fall within any of the below categories
<p>At risk of gentrification or displacement</p> <ul style="list-style-type: none"> Strong market In TOD Historic housing stock Losing market rate affordable units Employment center 	<p>At risk of displacement</p> <ul style="list-style-type: none"> Strong market In TOD Historic housing stock Losing market rate affordable units Employment center
<p>Undergoing displacement²</p> <ul style="list-style-type: none"> Already losing low income households, naturally affordable units, and in-migration of low income residents has declined Stable or growing in size 	<p>Undergoing displacement²</p> <ul style="list-style-type: none"> Already losing low income households Decline in either naturally affordable units or in-migration of low income residents Stable or growing in size
<p>Advanced Gentrification</p> <ul style="list-style-type: none"> Gentrified between 1990 and 2000 <i>or</i> between 2000 and 2013 	<p>Advanced Exclusion</p> <ul style="list-style-type: none"> Very low proportion of low income households Very low in-migration of low income households

¹ Tracts with 0 population in 2010 were excluded from the analysis (8 tracts). In addition, tracts where over 50% of the population in 2010 was in college were excluded from the analysis (11 tracts).

² On average Bay Area census tracts *gained* 59 low income households during the period 2000-2013. For tracts that were either stable or grew in population, the gain in low income households was even greater (average = 79). Therefore, we assume that a tract that is *lost* low income households during this period underwent some process of displacement when combined with other indicators such as a loss of market rate affordable units or a decline of the in-migration of low income population into that tract beyond the regional median.

Results

The following 10 maps present the results from the typology analysis for each of the Bay Area counties plus a map for the entire region. The total number of tracts and population in each type are summarized below in Table 2 and Figure 1 that show the majority of Bay Area tracts either did not experience displacement or were at very early stages (52%). Gentrifying tracts, where the demographic shifts and real estate investments surpass the regional trends (see the Appendix for our working definition), account for only part of overall displacement in the region. In fact displacement is occurring in both lower and higher income tracts that may not yet be showing such demographic shifts. 429 census tracts (27%) presented signs that may indicate a risk of displacement and/or gentrification in the future. Finally, 129 tracts (8%) were categorized as having experienced gentrification either during the period



1990-2000 or 2000-2013 and 28 tracts (2%) showed signs of advanced exclusion of low income households.

Table 2 Distribution of Displacement/Gentrification Types

Displacement type	Number of tracts	Population
Low Income (LI) – not losing LI HH or very early stages	339	1,575,041
LI – At risk of gentrification and displacement	294	1,347,250
LI – Undergoing displacement	67	309,337
LI – Advanced gentrification	129	537,222
Moderate-High Income (MHI) – not losing LI HH or very early stages	475	2,261,479
MHI – At risk of displacement	135	592,256
MHI – Undergoing displacement	102	465,487
MHI – Advanced exclusion	28	119,329

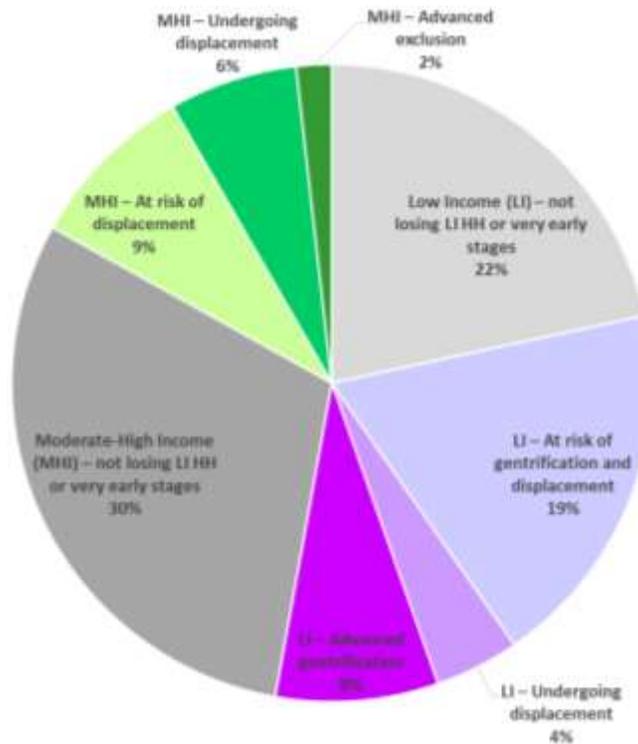


Figure 1 Distribution of Displacement/Gentrification Types

When looking at the distribution of typologies across tracts that contain a Priority Development Area (PDA) and those that do not, clear patterns emerge. Tracts that have PDAs were more likely to be lower income tracts that were categorized at risk of gentrification/displacement, undergoing displacement and

having already experienced gentrification. In contrast, tracts that had no PDAs were more likely to be higher income tracts that displayed signs of stability and exclusion.

Table 3 Distribution of Census Tract Types by Existence of PDA in Tract

Displacement type	Tracts with PDAs	Tracts without PDAs
Low Income (LI) – not losing LI HH or very early stages	183 (22%)	156 (21%)
LI – At risk of gentrification and displacement	230 (27%)	64 (9%)
LI – Undergoing displacement	46 (5%)	21 (3%)
LI – Advanced gentrification	104 (12%)	25 (3%)
Moderate-High Income (MHI) – not losing LI HH or very early stages	146 (17%)	329 (45%)
MHI – At risk of displacement	83 (10%)	52 (7%)
MHI – Undergoing displacement	37 (4%)	65 (9%)
MHI – Advanced exclusion	6 (1%)	22 (3%)

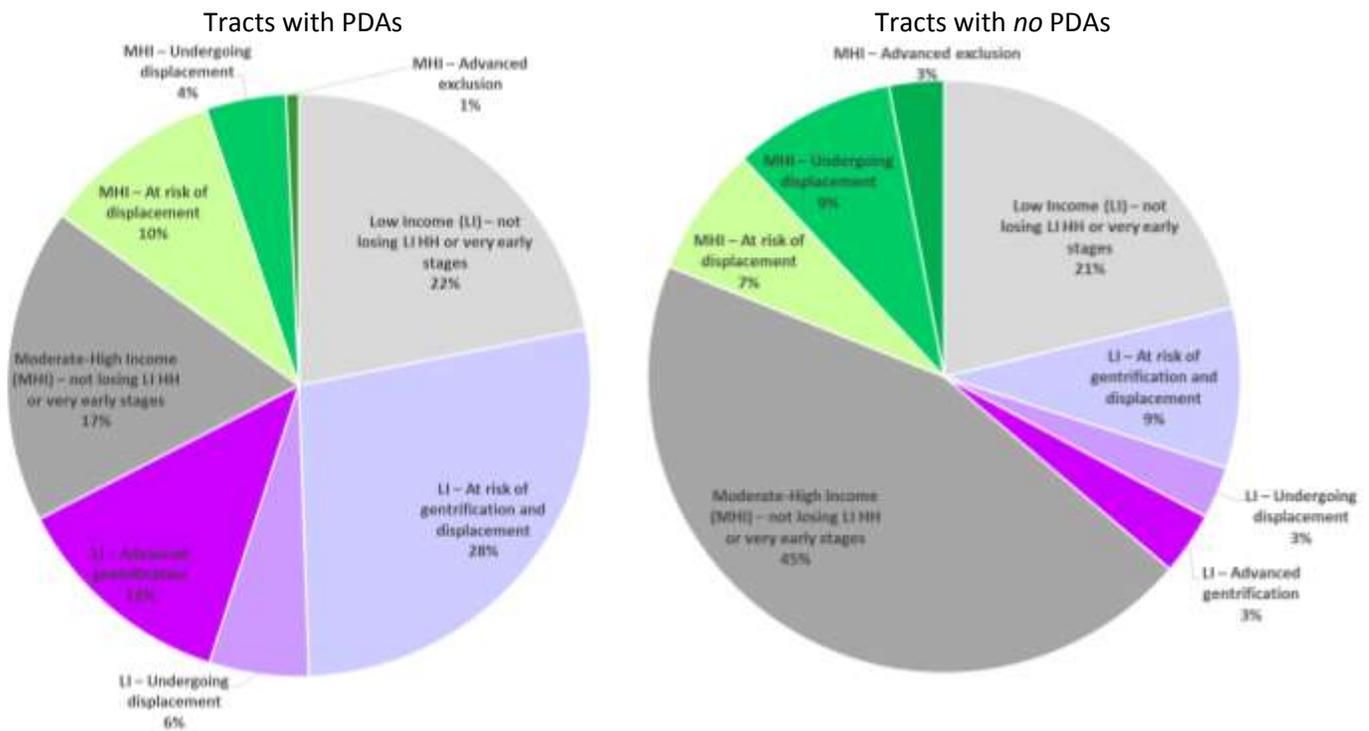
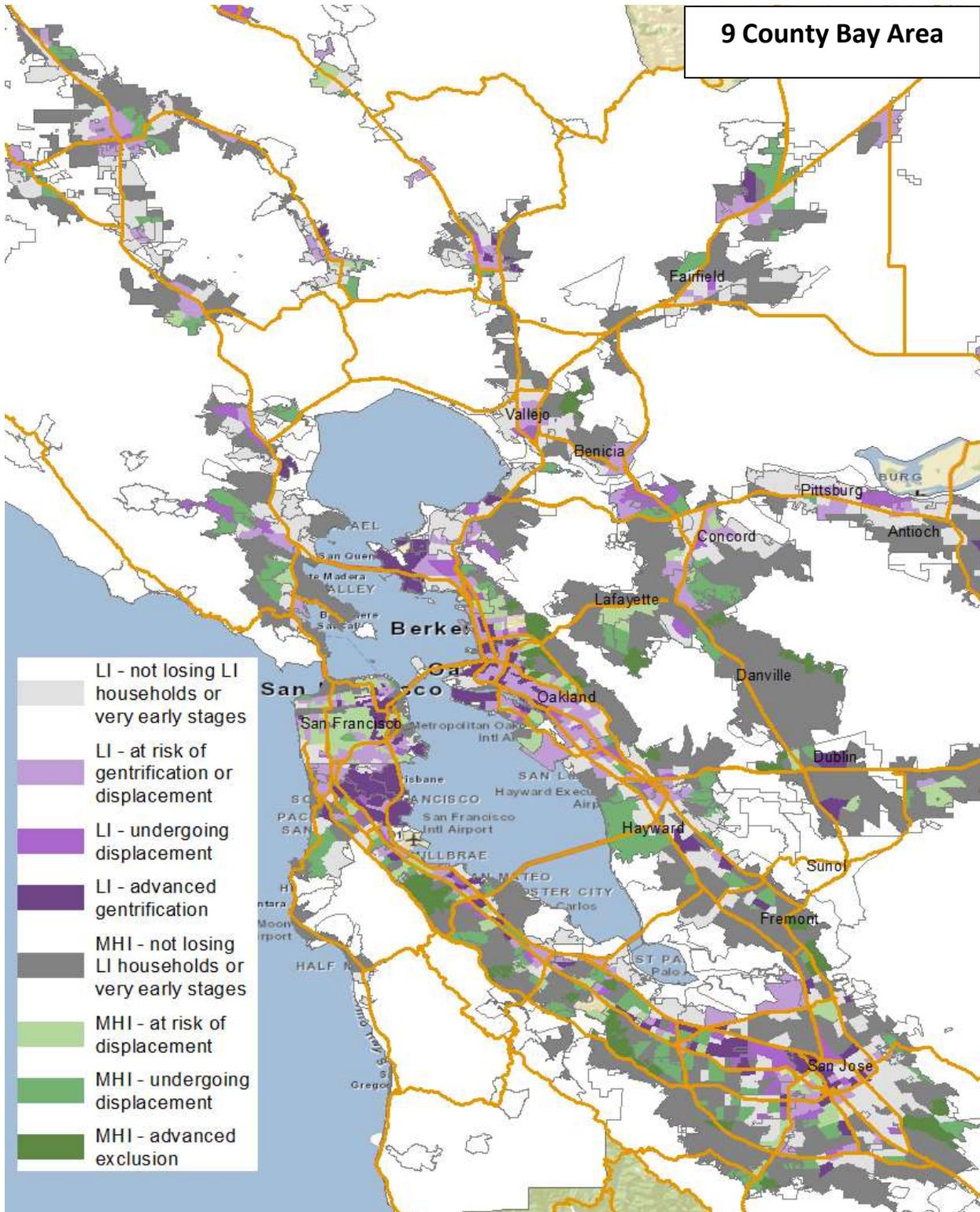
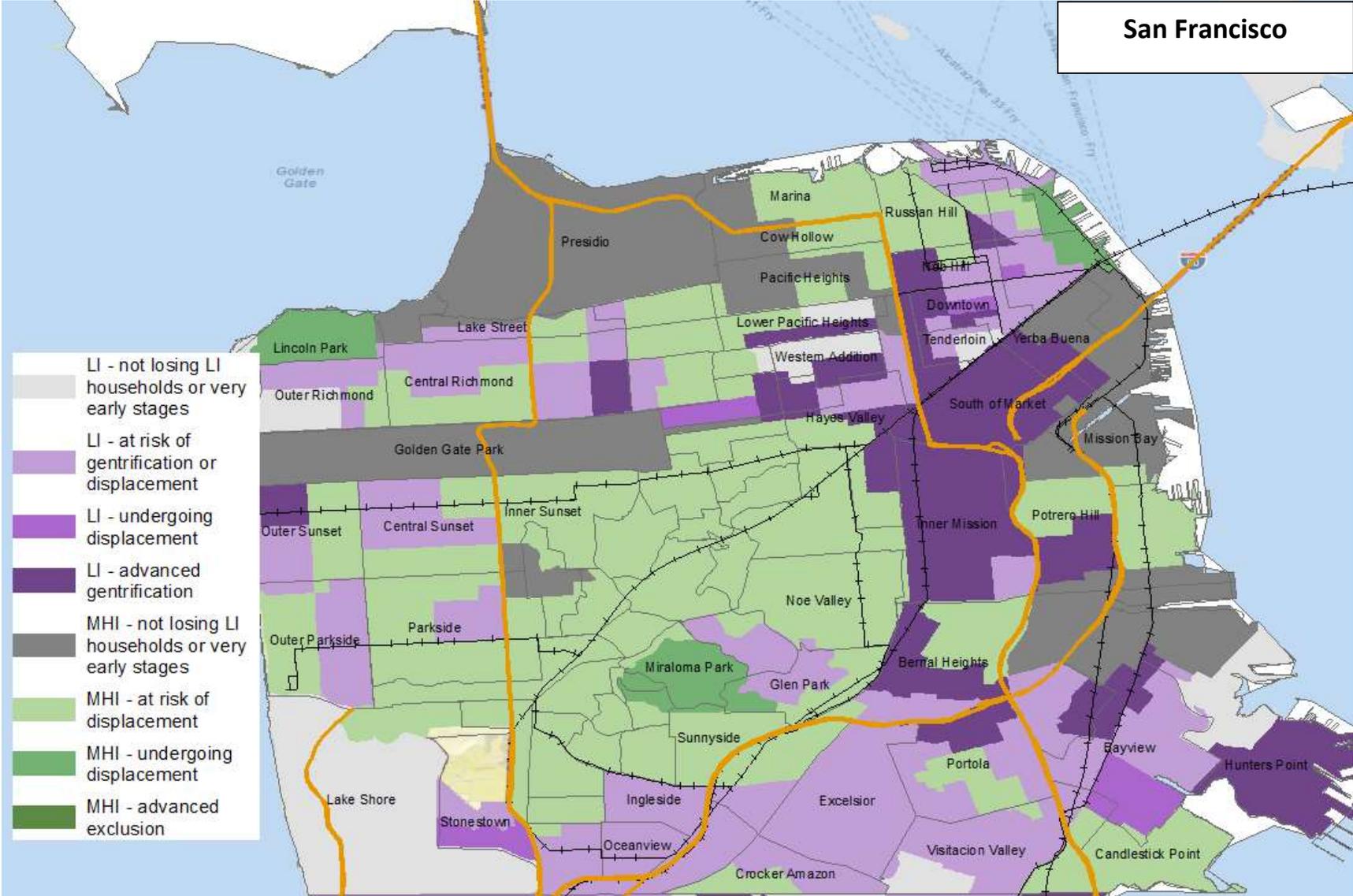


Figure 2 Distribution of Census Tract Types by Existence of PDA in the Tract

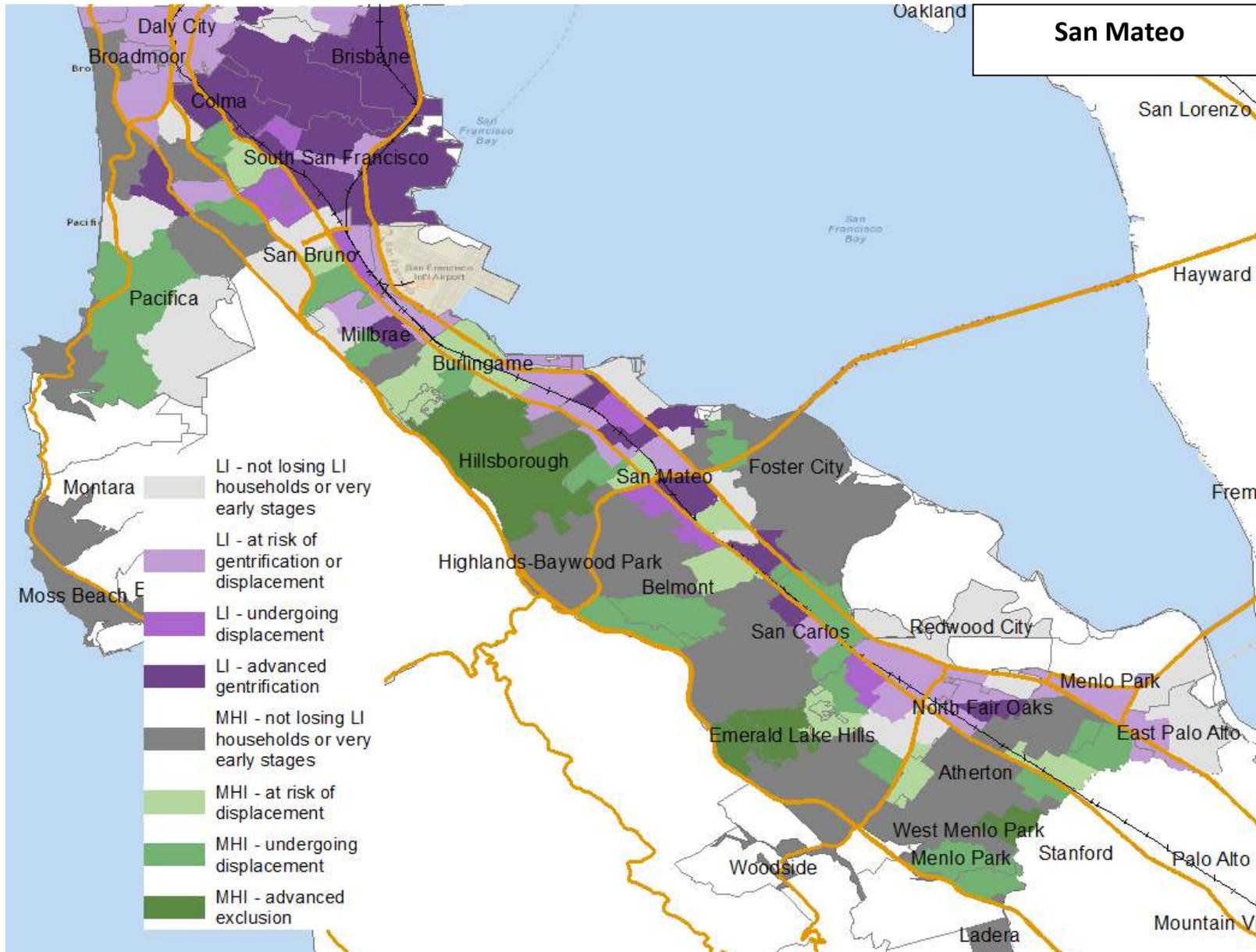
9 County Bay Area



San Francisco

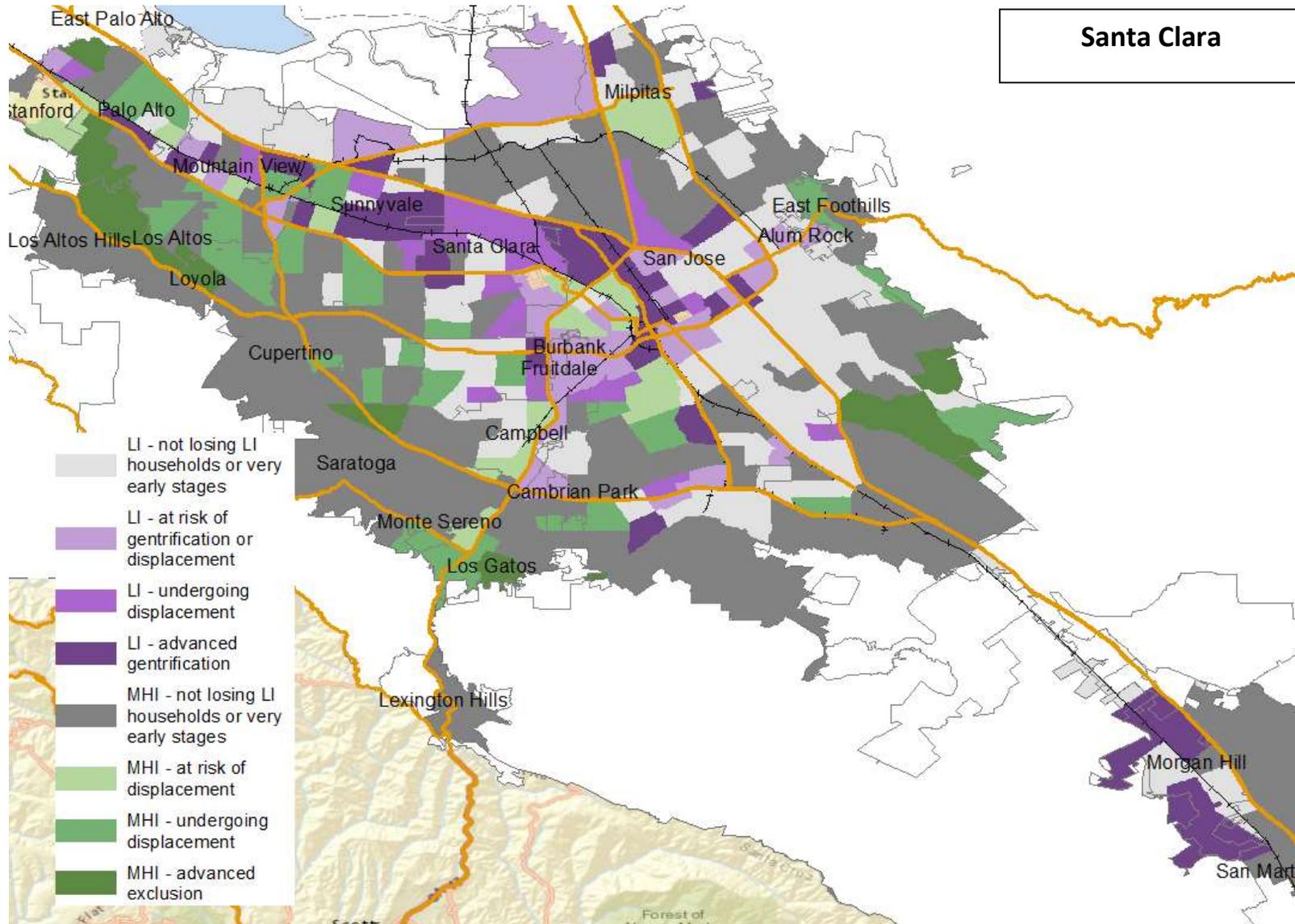


- 
 LI - not losing LI households or very early stages
- 
 LI - at risk of gentrification or displacement
- 
 LI - undergoing displacement
- 
 LI - advanced gentrification
- 
 MHI - not losing LI households or very early stages
- 
 MHI - at risk of displacement
- 
 MHI - undergoing displacement
- 
 MHI - advanced exclusion

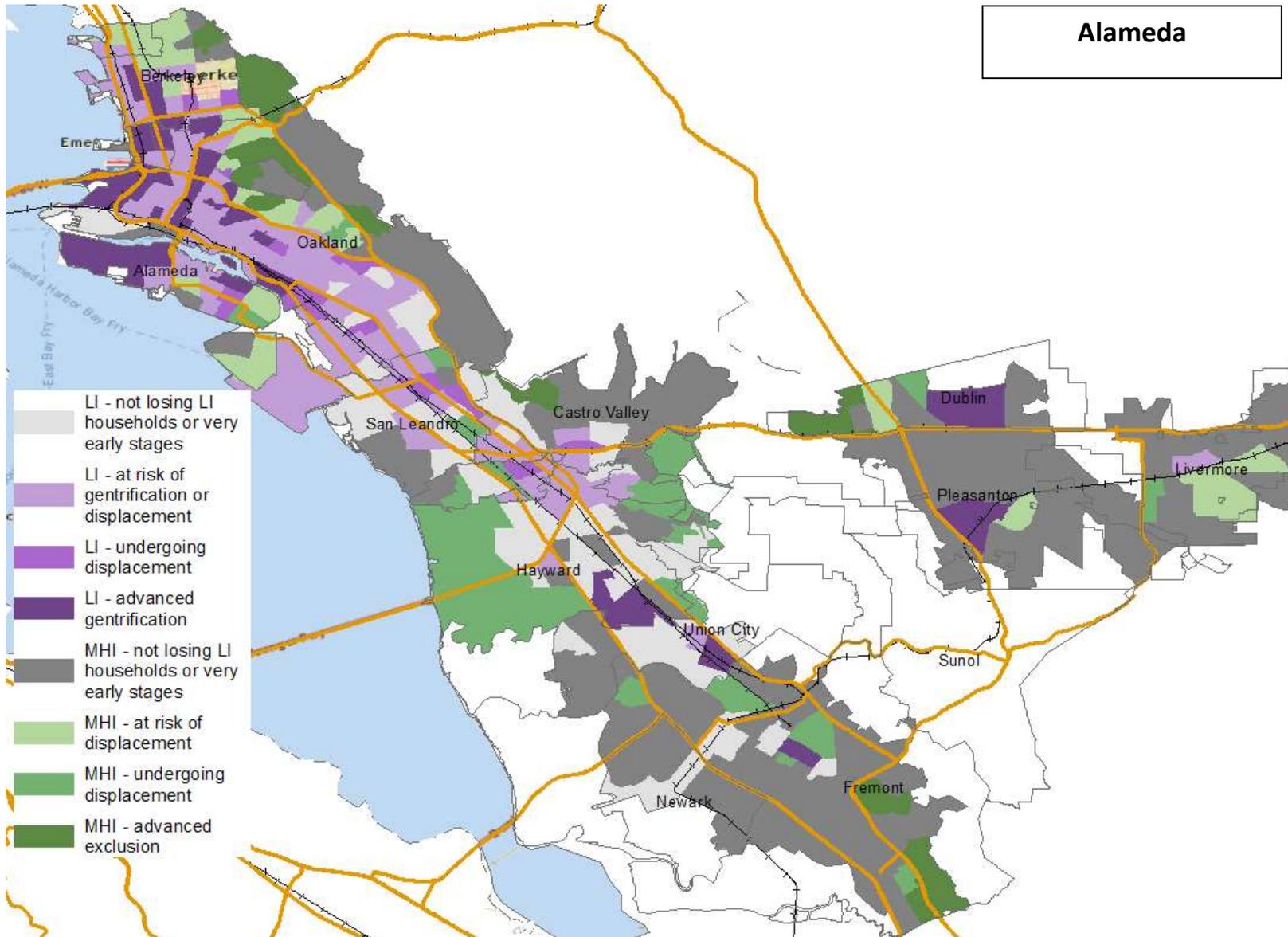


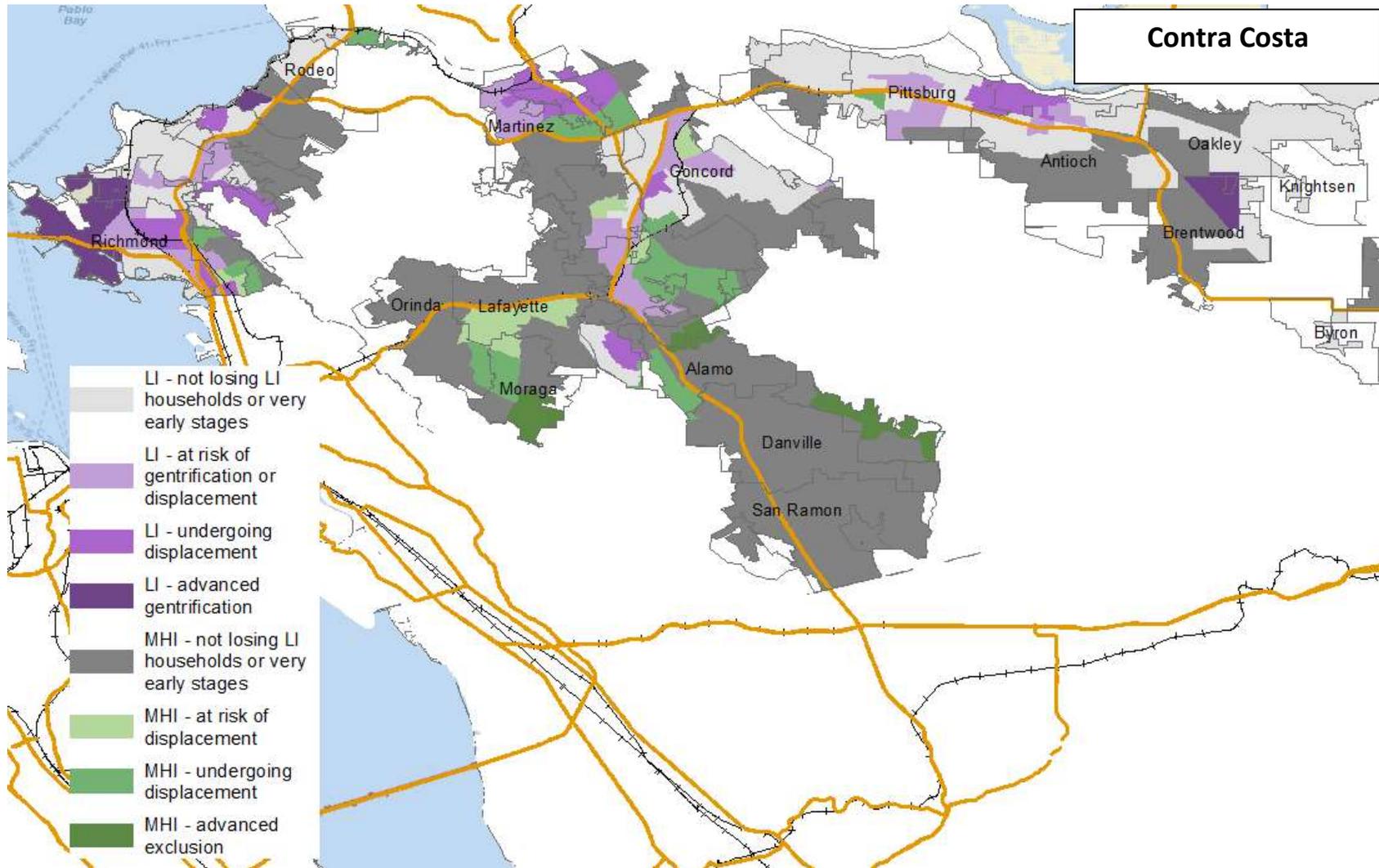


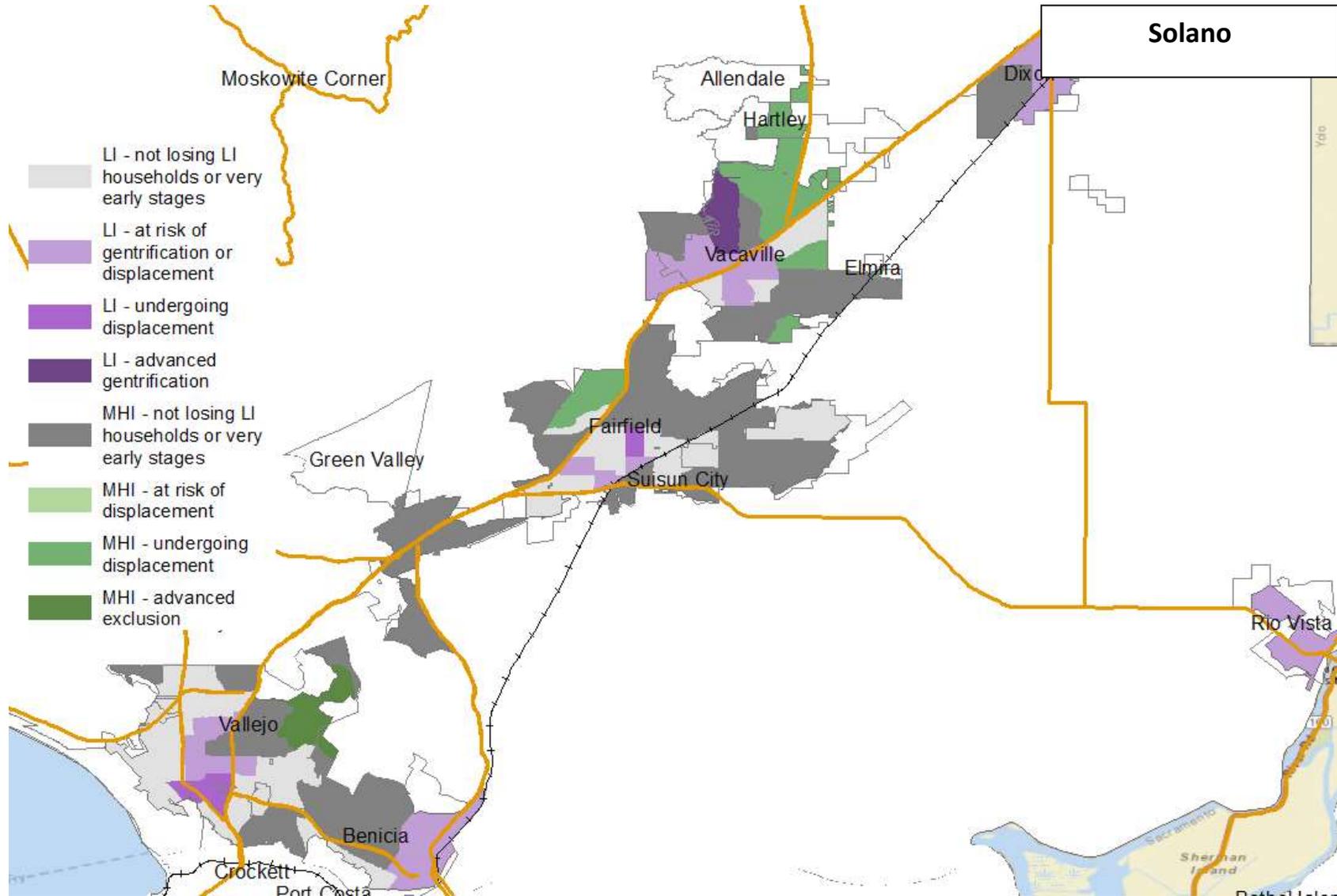
Santa Clara



Alameda

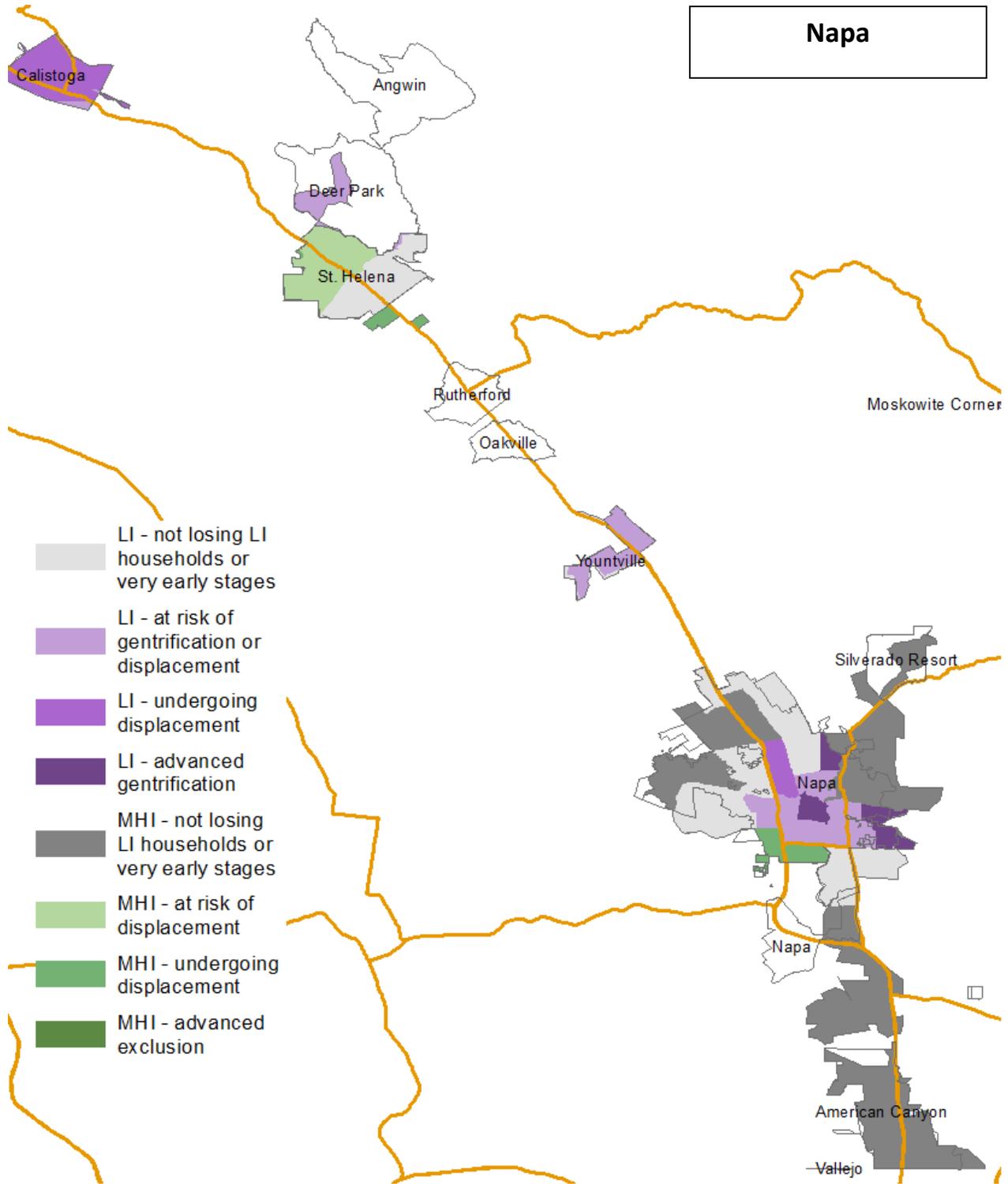






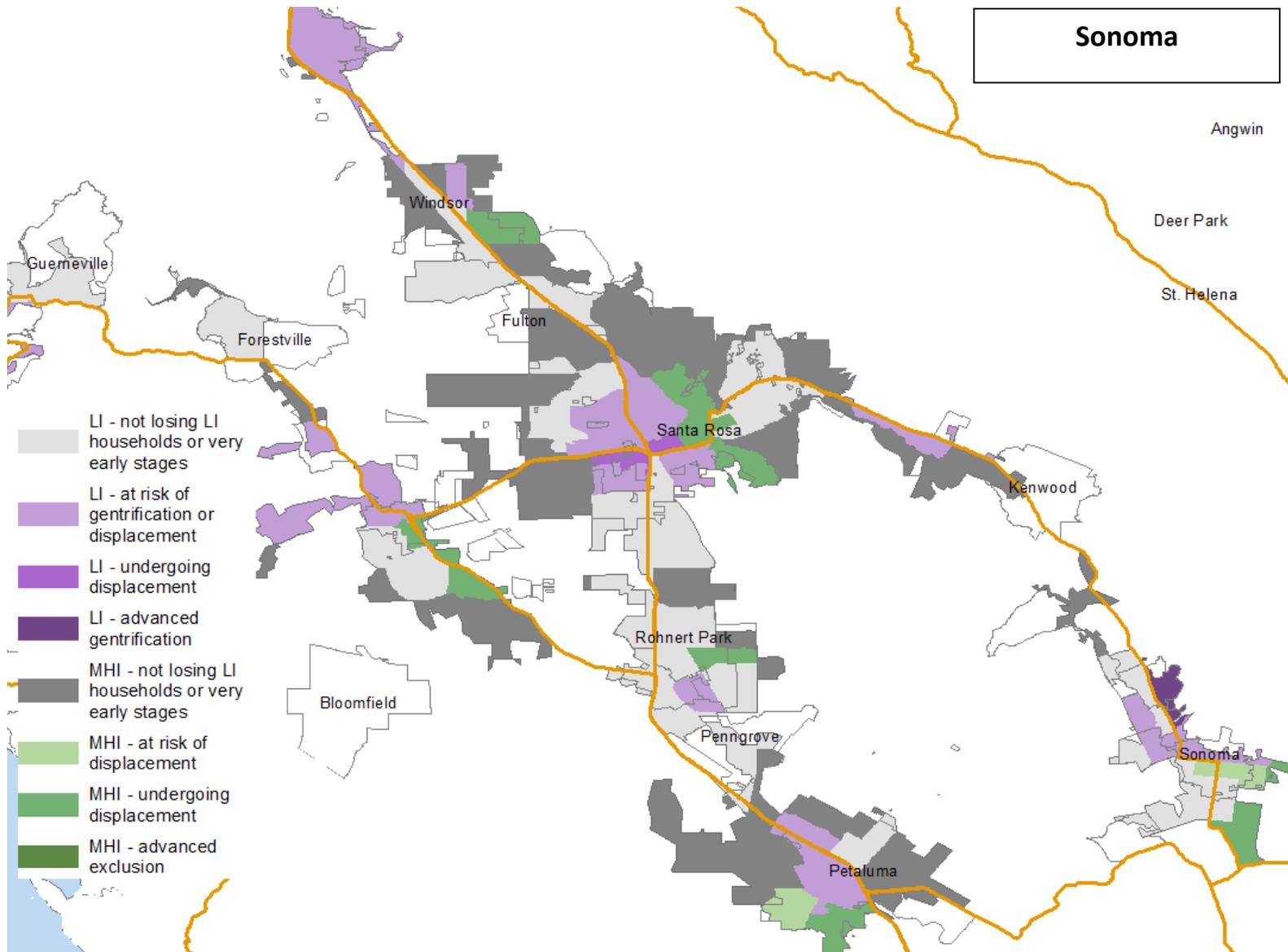


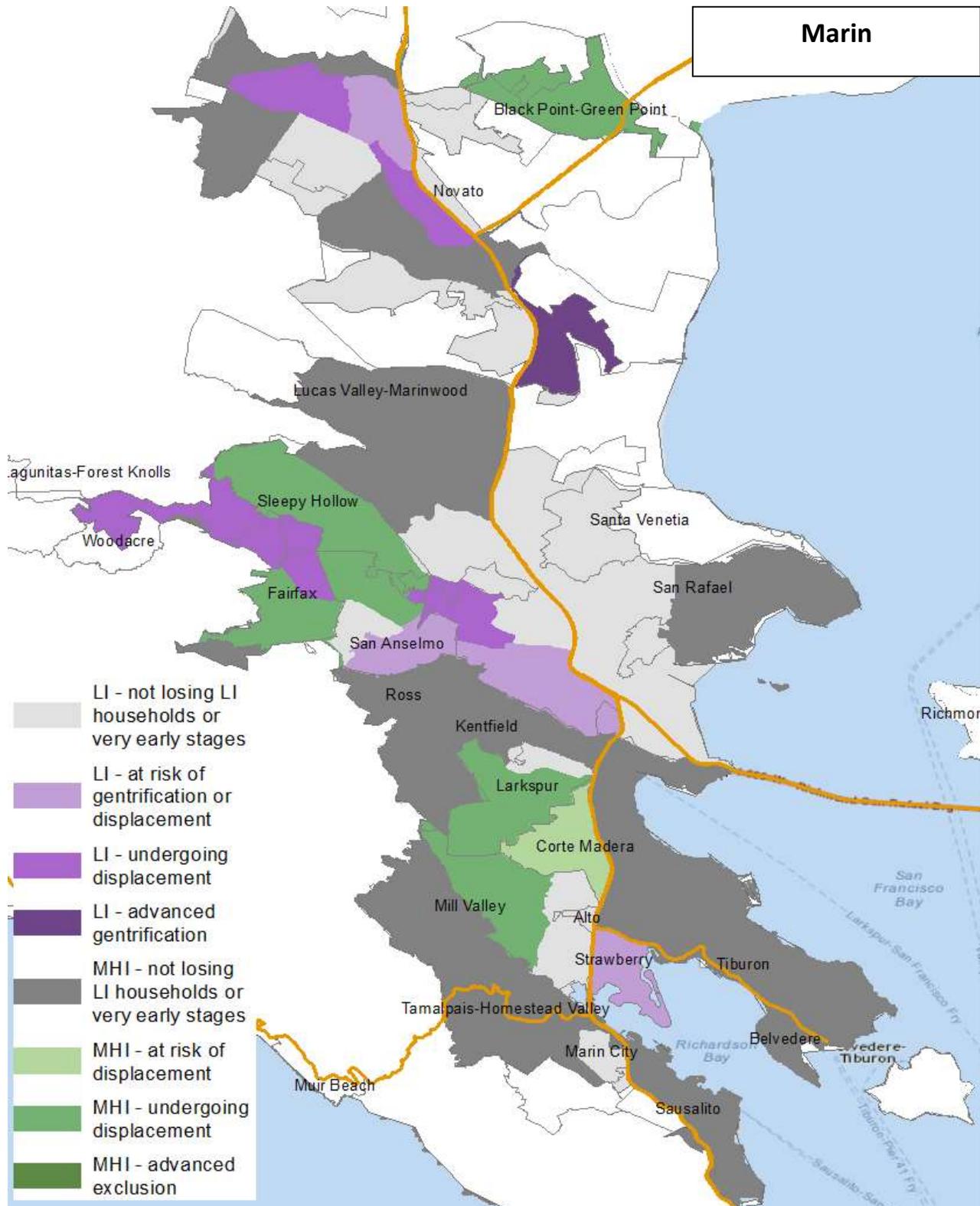
Napa





Sonoma







Appendix

Defining Gentrification

We reviewed the literature on gentrification and combined several methods to reflect the unique conditions of the Bay Area. The main methods we followed were derived from the national analysis by Lance Freeman (2005), the work done by Lisa Bates for Portland (2013) and replicated in the Bay Area (CJJC 2014; Moore, Gambhir, and Tseng 2015) and the recent analysis of the largest 50 cities in the United States by Governing Magazine (Maciag 2015). Combining these three methods, and adapting them based on data availability and our knowledge of the nature of neighborhood change in the Bay Area, we utilized the following four criteria to define a census tract as having gentrified between years 1 and 2.

1. Tracts with at least 500 people in year 1
2. Vulnerable in year 1 (at least 3 out of 4 of the following indicators):
 - % low income households is above regional median
 - % college educated is below regional median
 - % renters above regional median
 - % nonwhite above regional median
3. Demographic change between years 1 and 2:
 - Growth in % college educated > region
 - Growth in median household income > region
4. Investment between years 1 and 2:
 - % market rate units built between year 1 and 2 is greater than regional median
 - Growth in either:
 - Single family sales price per square foot > regional median
 - Multi-family sales price per square foot > regional median
 - Home value > regional median (where sales value is unavailable = 57 tracts)

Using these criteria, we find that 83 tracts gentrified between 1990 and 2000 and 65 tracts gentrified between the years 2000 and 2013. Of these 65 that gentrified between 2000 and 2013, 19 were actually tracts that gentrified between 1990 and 2000 as well. In total we estimate that 129 tracts gentrified between 1990 and 2013.

We should note that we use the term gentrified here to characterize a process of both demographic and physical change of a neighborhood. The fact that a tract has gentrified between two years does not preclude them from continued change. In fact, of the 129 tracts that we estimate to have gentrified between 1990 and 2013, 71 had lower rates of growth of low income households than the rest of the region, 105 lost naturally affordable housing, and 100 had lower rates of in-migration of low income residents in 2013 than they did in 2009. Furthermore, 88 of the gentrified tracts continue to have higher proportions of low income households than the region (39%).



Modeling results

Table 4 summarizes the results of the linear (loss of low income households) and logistic (gentrification) regression models that were run to better understand the predictors of these processes and develop indicators used to identify tracts at risk of displacement and gentrification.

Table 4 Modeling Results for the Loss of Low Income Households and Gentrification, 2000-2013

Model	TOD in tract (2000)	% units in pre-1950 building (2000)	Loss of naturally affordable housing (2000-2013)	Employment Density (2000)	Increase in property sales value (2000-2013)	Increase in Rent (2000-2013)	New Market Rate Units (2000-2013)
Loss of low income households (00-13) ¹	**	**	****	*	**	****	**
Gentrified (00-13)	*	****	****	***	n/a	n/a	n/a

¹ population growth and density were included as controls

*p<.2, ** p<.1, ***p<.05, ****p<.01

n/a = not applicable because the variable is part of the definition of gentrification

Displacement Typologies

In order to capture the displacement pressures occurring in tracts that are majority higher income, but still have a significant stock of affordable housing and/or households, tracts were divided into those that higher percentages of low income households than the regional median (>39% in 2009-2013, 802 tracts) and those that have lower shares of low income households than the regional median (<39% in 2009-2013, 778 tracts). The actual income mix in any of these communities varies widely, as demonstrated in Table 5. It's important to note that households were categorized as low income if they earned less than 80% of the County median household income (Table 6). The County was used rather than the 9 Bay Area to try to capture some of the regional variability in income levels.

Table 5 Income Distributions for Lower Income (> 39% LI) and Higher Income (<39% LI) Census Tracts (2009-2013)

Tract income type	Median tract-level households income	Minimum tract-level household income	Maximum tract-level household income
Large low income population (> 39% of households have income < 80% county median)	\$58,822	\$12,018	\$106,023
Moderate to high income (<39% households have income < 80% county median)	\$112,416	\$61,964	\$250,001



Table 6 80% County Median Household Income (2009-2013)

County	80% Median income
Alameda	\$57,442
Contra Costa	\$64,700
Marin	\$70,791
Napa	\$56,879
San Francisco	\$62,900
San Mateo	\$73,181
Santa Clara	\$74,525
Solano	\$51,802
Sonoma	\$51,955

Once divided into lower and higher income, the tracts were categorized as a) not losing low income households or very early stages, b) at risk of displacement, c) undergoing displacement, and d) advanced stages. These categories were defined based as follows:

Lower Income Tract Displacement Type Criteria

- 1. Not losing low income households or very early stages of gentrification/displacement**
 - Percent low income > regional median (39%)
 - Not categorized as at risk, undergoing displacement or advanced gentrification
- 2. At risk of gentrification and/or displacement**
 - Population in 2013 over 500
 - Percent low income > regional median (39%)
 - Signs of vulnerability to gentrification/loss of low income HH (at least 4 out of 7):
 1. Has rail station in tract
 2. % of units in prewar buildings > regional median
 3. Loss of market rate units affordable to low income households > regional median (2000-2013)
 4. Employment density > regional median (2011)
 5. Rent increase > regional median (2000-2013)
 6. Real estate sales value increase more than regional median (2000-2013)
 7. Development of market rate units > regional median (2000-2013)
- 3. Undergoing Displacement: Losing low income households and decline in either low income in-migration or market rate affordable housing**
 - Population in 2013 over 500
 - Percent low income > regional median (39%)
 - Lost low income households from 2000-2013
 - Either:
 - Reduction of low income in-migration between 2009-2013 > regional median
 - Lost market-rate affordable housing for low income population 2000-2013 > regional median



- Either stable or growing in population or households

4. Low income - Advanced Gentrification

- Gentrified between 1990-2000 or 2000-2013 per definition above

Moderate-High Income Tract Displacement Type Criteria

5. Not losing low income households or very early stages of displacement

- Percent low income < regional median (39%)
- Not classified as at risk, undergoing displacement or advanced exclusion

6. At risk of Displacement

- Population in 2013 over 500
- Percent low income < regional median (39%)
- Signs of vulnerability to loss of low income HH (at least 4 out of 7):
 1. Has rail station in tract
 2. % of units in prewar buildings > regional median
 3. Loss of market rate units affordable to low income households > regional median (2000-2013)
 4. Employment density > regional median (2011)
 5. Rent increase > regional median (2000-2013)
 6. Real estate sales value increase more than regional median (2000-2013)
 7. Development of market rate units > regional median (2000-2013)

7. Undergoing displacement

- Population over 500
- Percent low income < 39% in 2013
- Lost low income households from 2000-2013
- Either:
 - Reduction of low income in-migration between 2009-2013 > regional median
 - Loss of naturally affordable housing for low income population 2000-2013 > regional median
- Either stable or growing in population or households

8. Advanced Exclusion

- Population over 500
- Percent low income < 10th percentile in 2000 (20% low income households)
- Percent low income < 10th percentile in 2013 (20% low income households)
- Either
 - In-migration of low income residents lower than regional median in 2009, *or*
 - In-migration of low income residents lower than regional median in 2013



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