



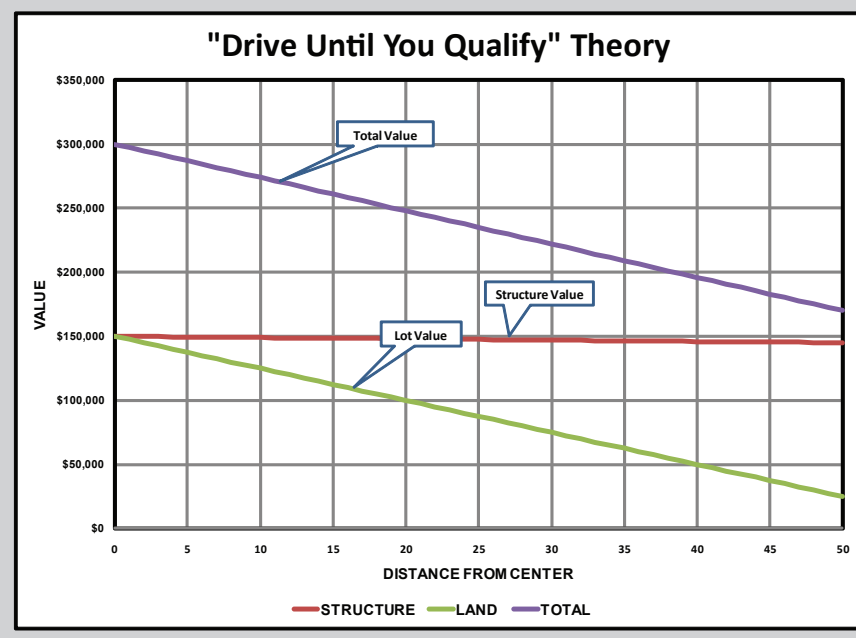
# DRIVE UNTIL YOU QUALIFY: A COMPARISON OF SAN DIEGO & THE TWIN CITIES URBAN AREAS

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## Abstract

"Drive until you qualify" is a phrase often cited as a major cause of urban sprawl and increasing dependence upon foreign oil. The primary idea is that house prices decay with distance from the center of a city because of falling land prices. This study analyzes empirical data from a variety of sources to model the price/distance dynamic and compare it in two metropolitan areas: coastal San Diego, CA and the land-locked "twin cities" of Minneapolis and St. Paul, MN. While generally true, the phenomenon has strong directional biases and responds well to transportation corridors and physical barriers.

This graph illustrates the hypothesis of "drive until you qualify." As distance from city center increases, lot value decreases. Demand for land is higher closer to the city center and decreases with distance. The structure value remains relatively constant. The decline in total value correlates directly with the decrease in lot value.

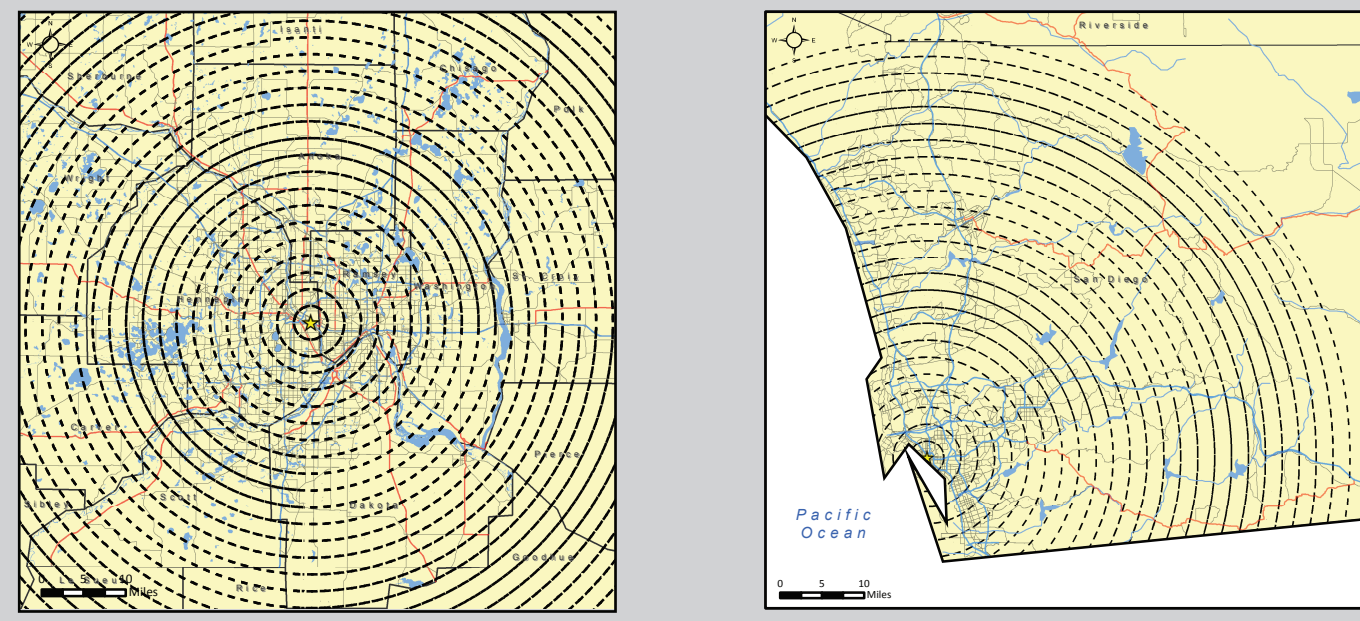


## Data and Study Areas

Data for the Twin Cities was collected by looking up for-sale residences and checking the land and house value on county assessor websites. There were a total of 560 data points used in the analysis. Data for San Diego was derived from a database from multiple sources. There were a total of 9,153 data points used in the analysis.

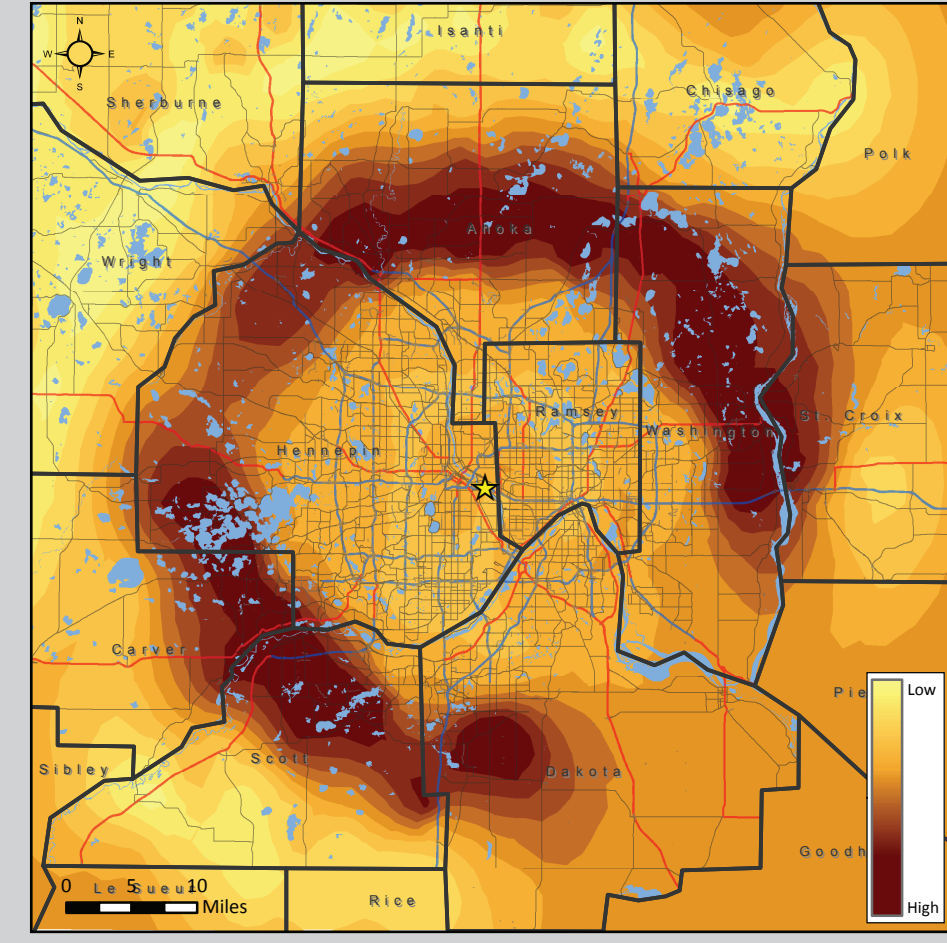
The center of the city was chosen due to a variety of factors. In the Twin Cities it is located at the intersection of I-94 and the Mississippi River between St. Paul and Minneapolis. The center for San Diego was chosen at the intersection of Market and Harbor Streets.

The sample data points contained a great deal of directional and other "noise" that was removed by averaging all data by two mile bands (shown in maps below). This band data provides a "normalized" view of lot size and structure raw and square foot values. The total band distance for the Twin Cities was 52 miles, while for San Diego it was 50 miles. The difference is due to a lack of data at that distance in San Diego.

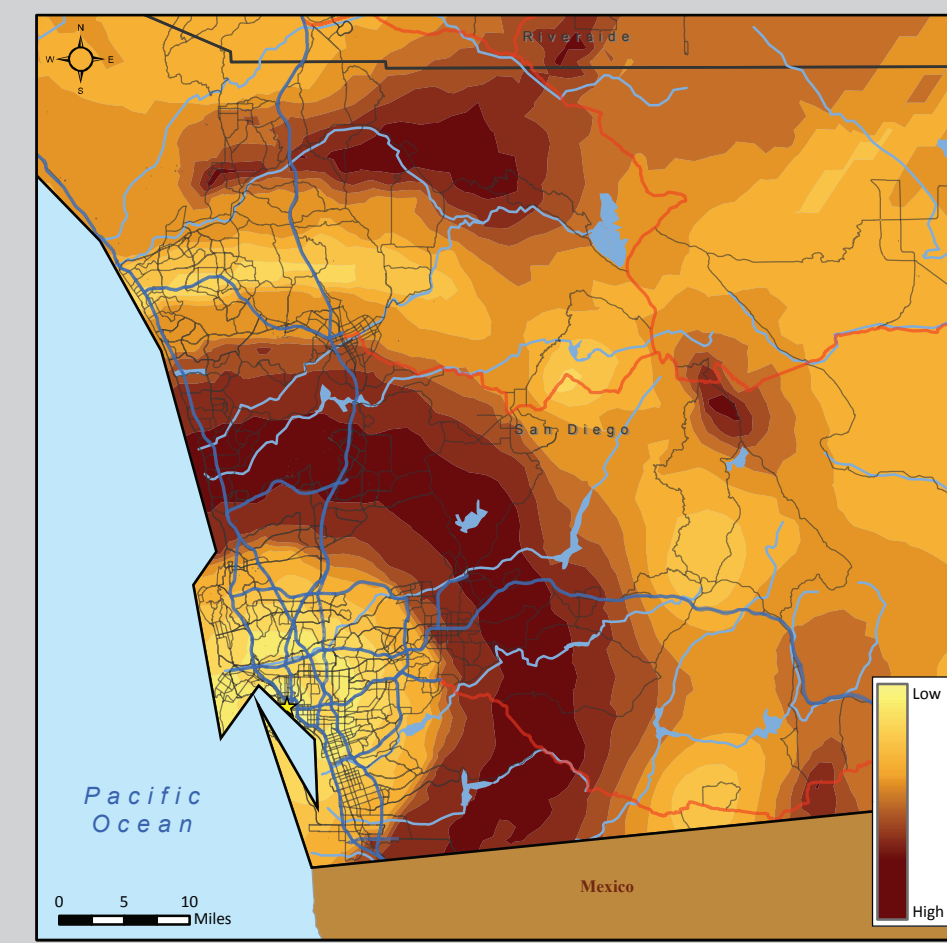
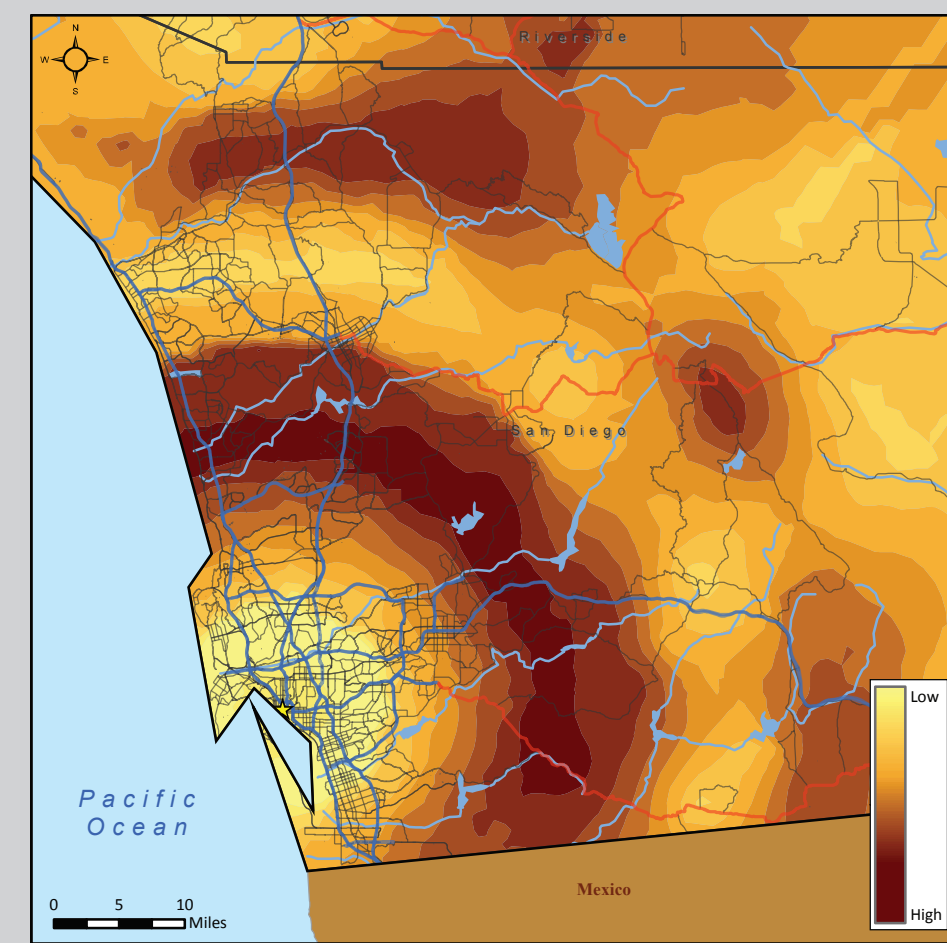
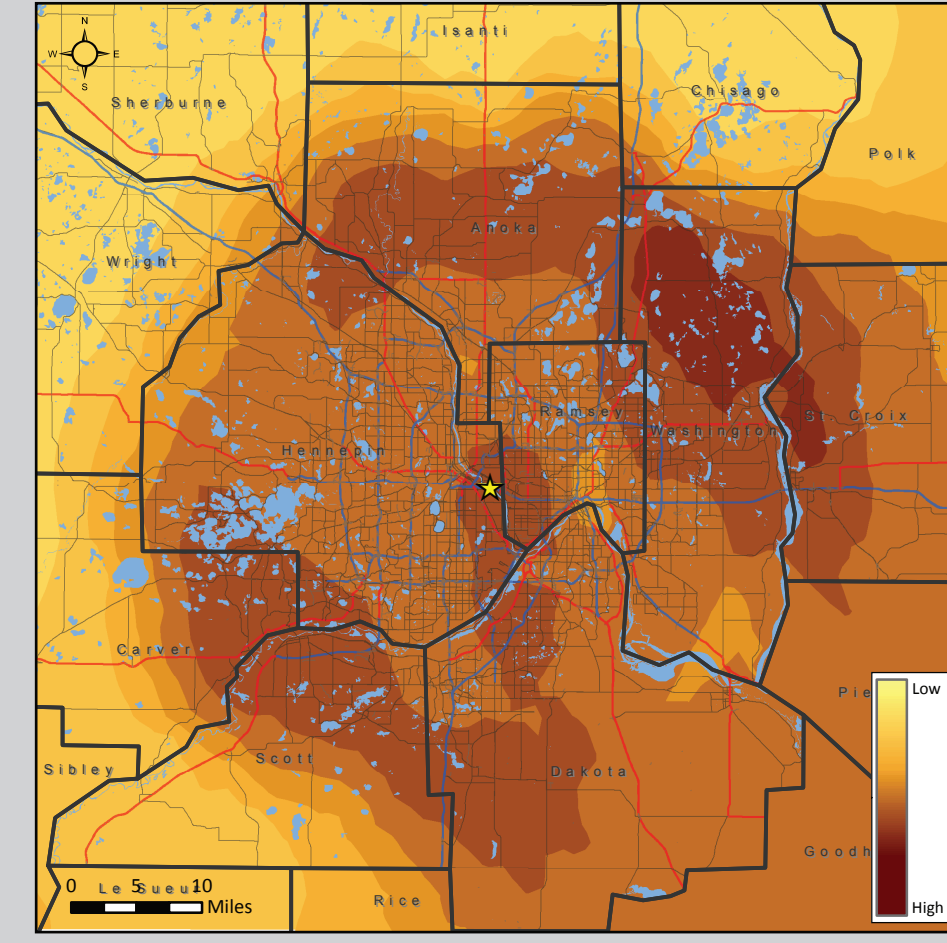


## Value Analysis

### Structure Value

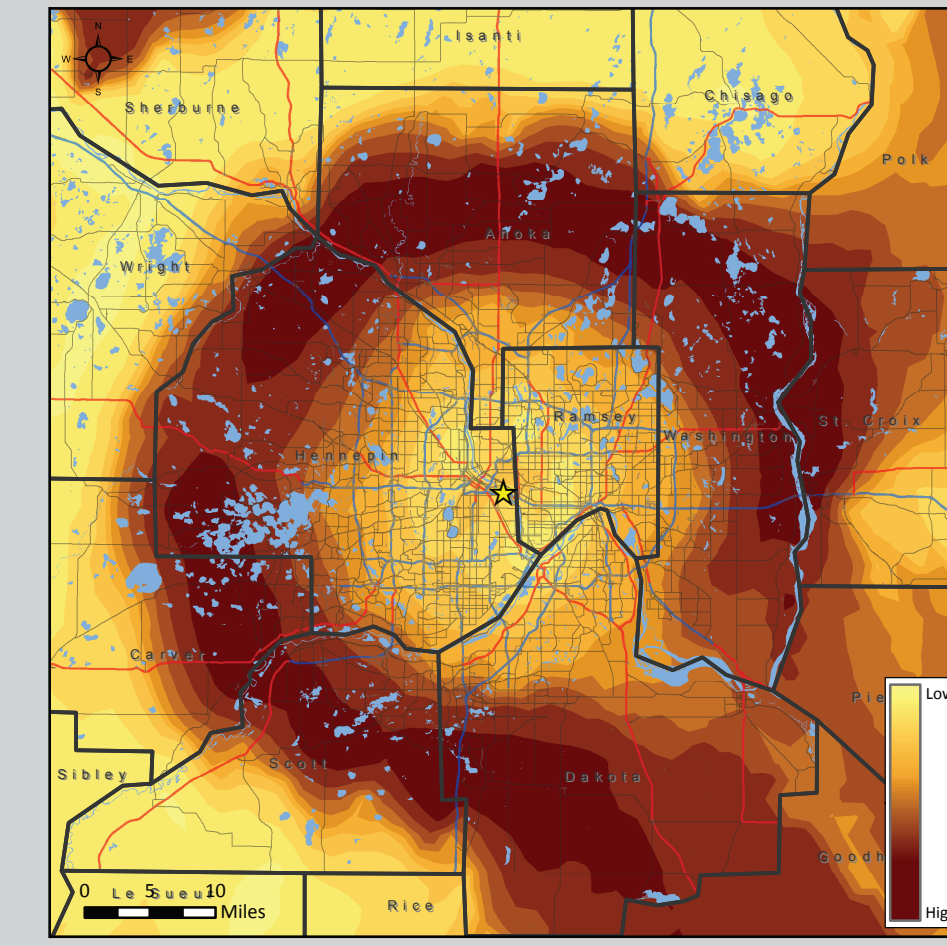


### Structure Value per Sq Ft

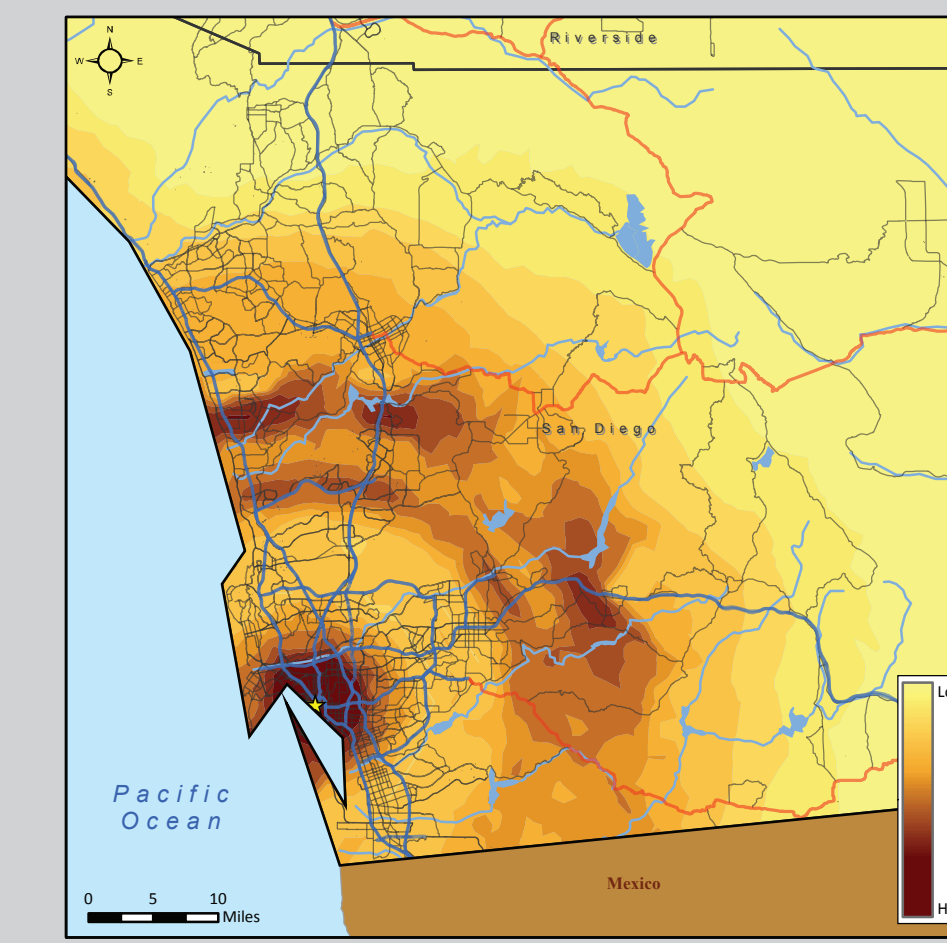
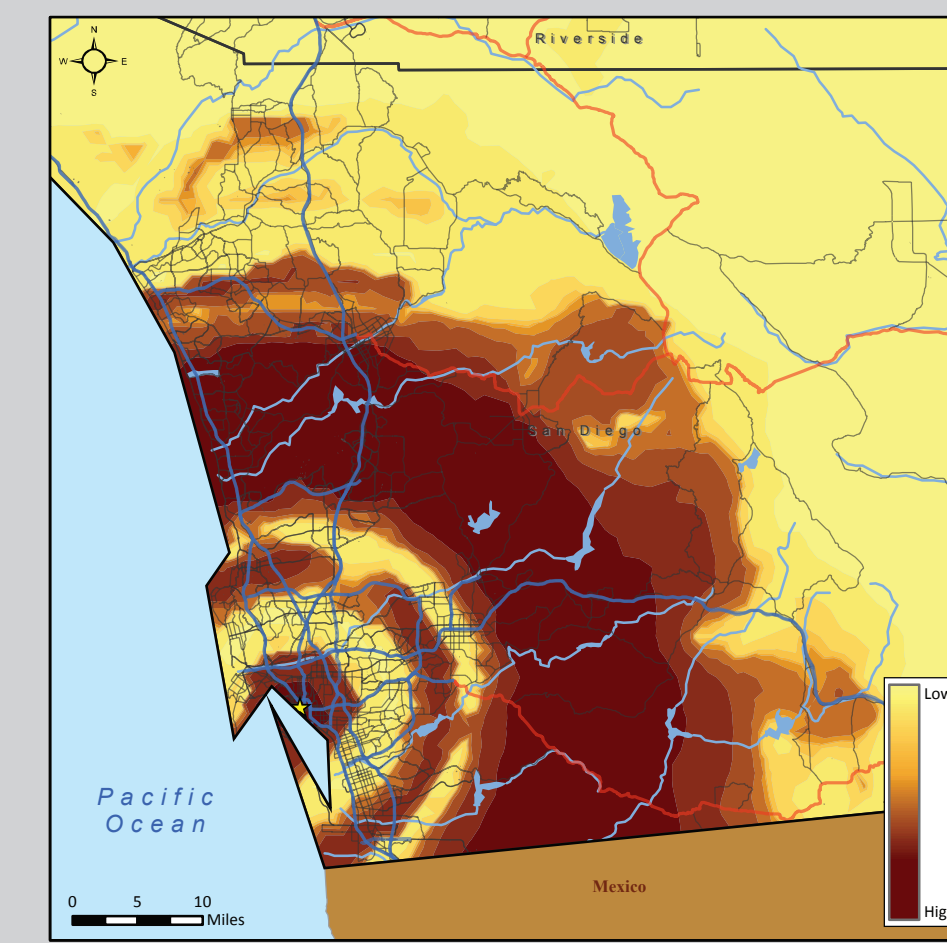
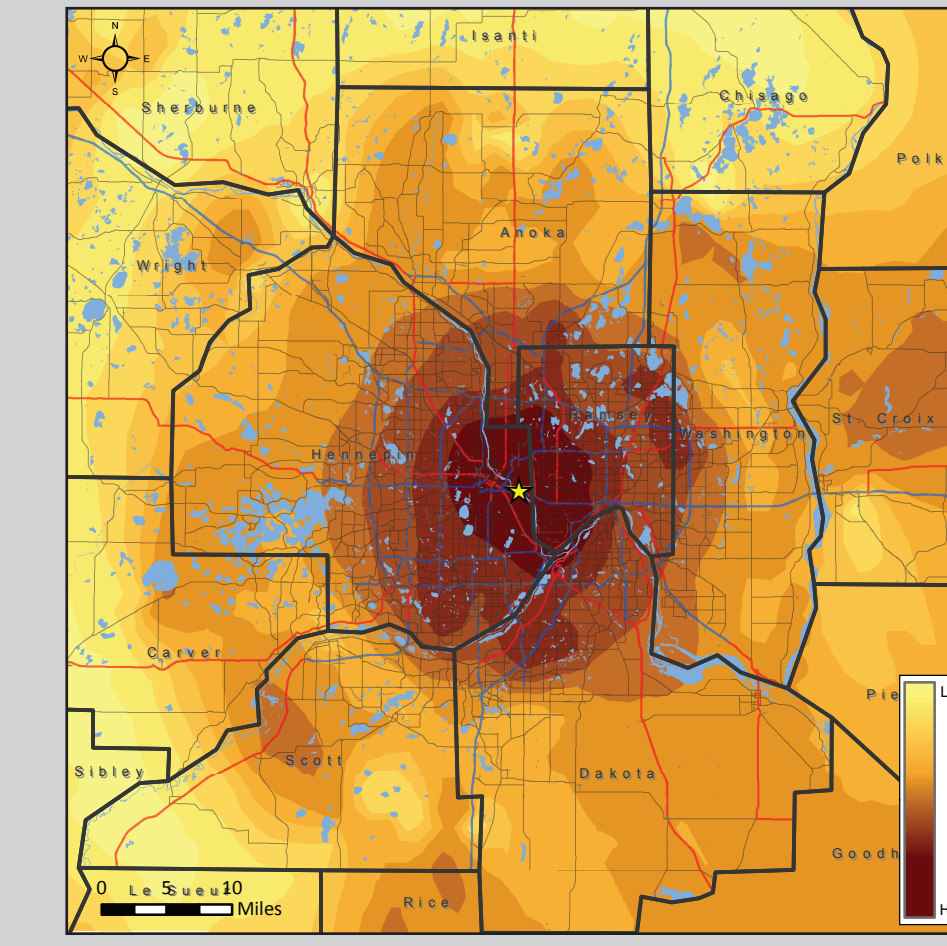


For both cities, raw structure value peaks at the 18-26 mile bands. When the data is normalized to cost per square foot, the high-value ring disappears in the Twin Cities, yet it remains present in San Diego. This shows that housing value is not closely related to distance from city center in the Twin Cities, although it does fluctuate slightly, decreasing with distance from city center and then increasing slightly around the suburbs. In San Diego, structure cost per square foot is much higher at the 18-26 mile bands. The high-end quality of housing in San Diego suburbia is a likely factor in this difference, among others.

### Lot Value



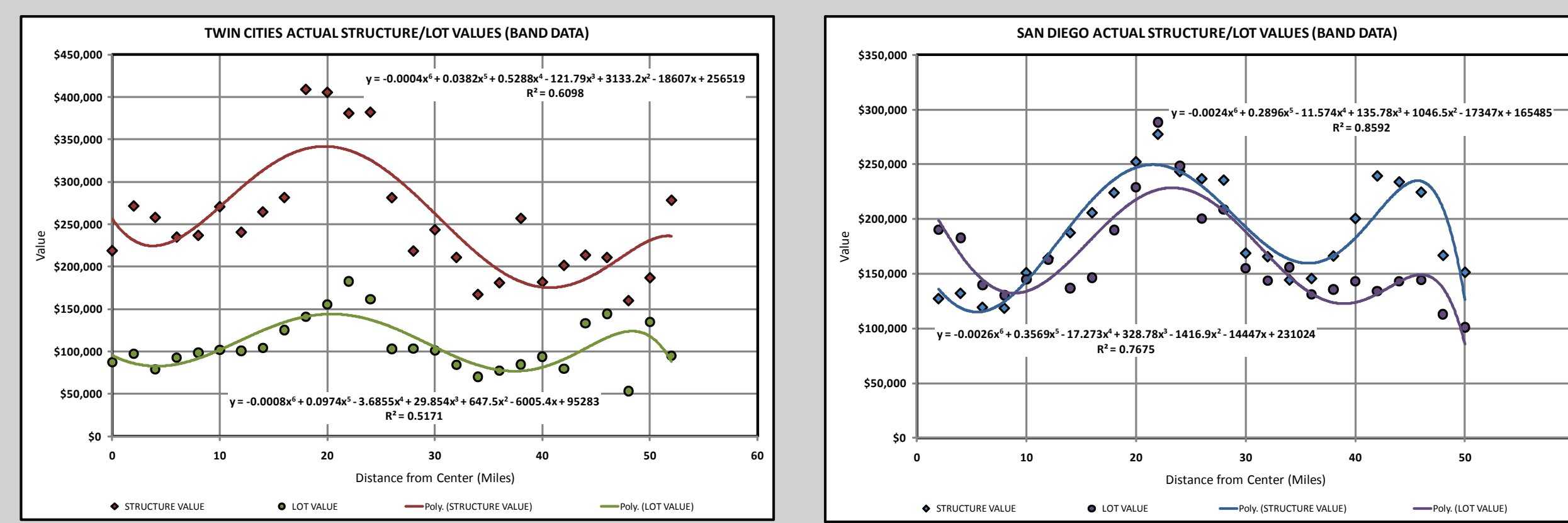
### Lot Value per Sq Ft



In the Twin Cities, lot value is highest in the 18-26 mile band. This can be partially explained by waterfront property which causes a major increase in lot value. In San Diego, a slightly different pattern is evident. Lot values begin quite high, and then decrease at around 3 miles, increase at around 7 miles, then decrease, and then increase again at 10 miles. The extreme value of coastal property followed by desirable suburban living may play a role in this pattern.

When this data is normalized by cost per square foot, the highest values are around the city center, for both cities. Lots are much smaller in the center of the city but because of the demand for them and their location they have a higher value per square foot.

## Structure Value vs. Lot Value



These graphs show a strong statistical correlation between distance from city center and lot value or structure value. The sixth order polynomial equation for distance and structure value "explains" approximately 61% of variation in the data for both San Diego and the Twin Cities. This similarity is quite remarkable. For lot values, the correlation is much stronger for San Diego, with the equation explaining 77% of the variation, while it provides only a 52% explanation for the Twin Cities.

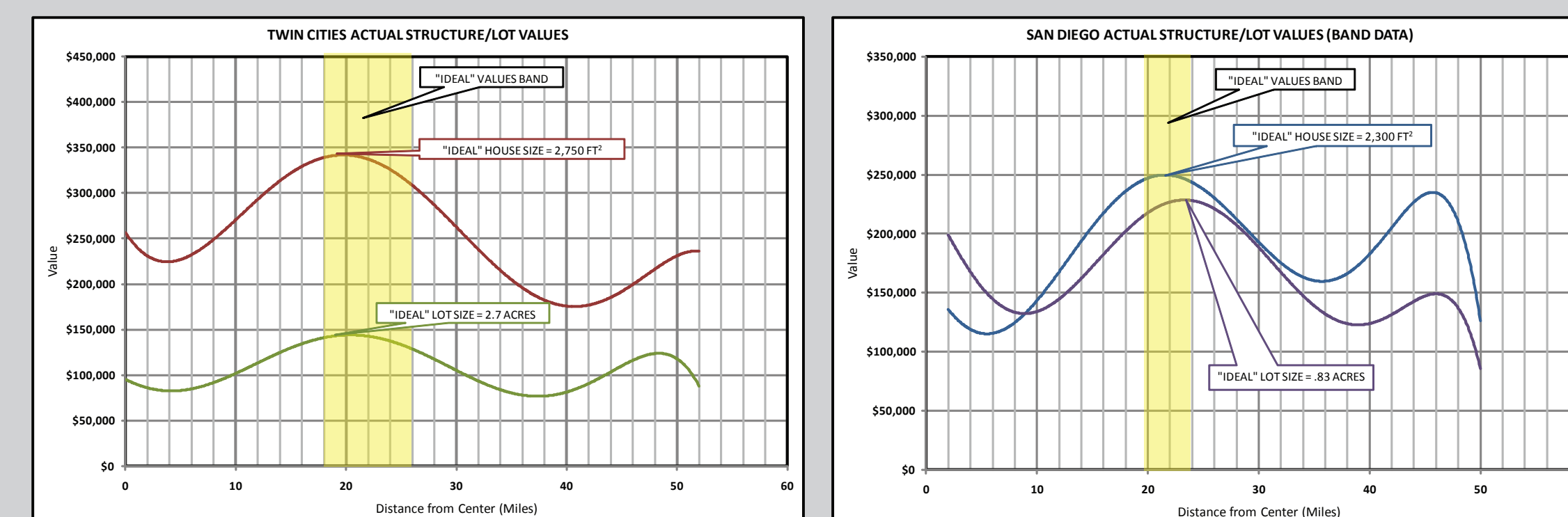
## Ideal Analysis

### "Ideal" Bands

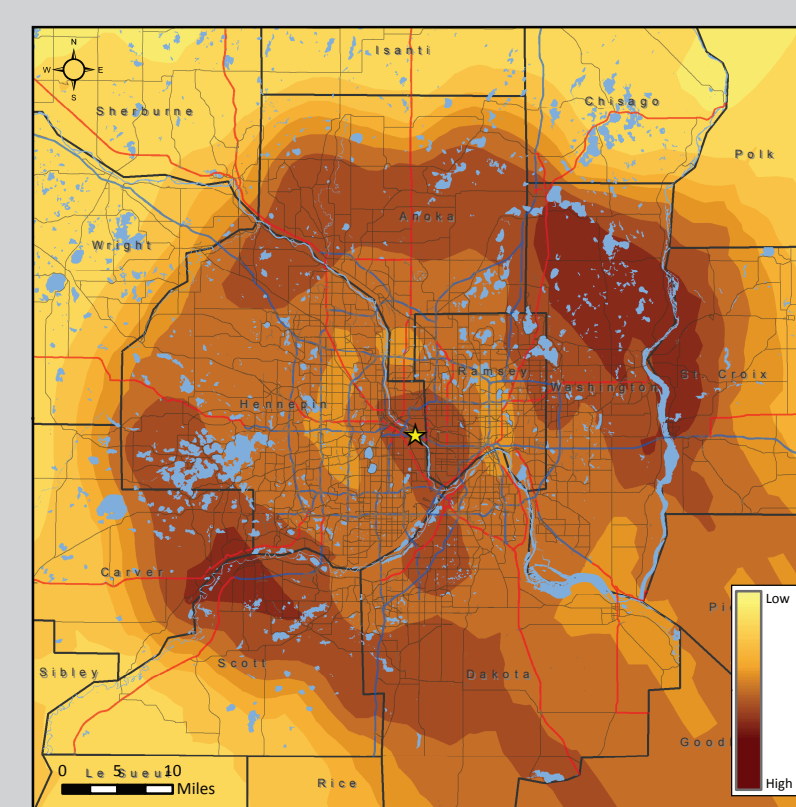
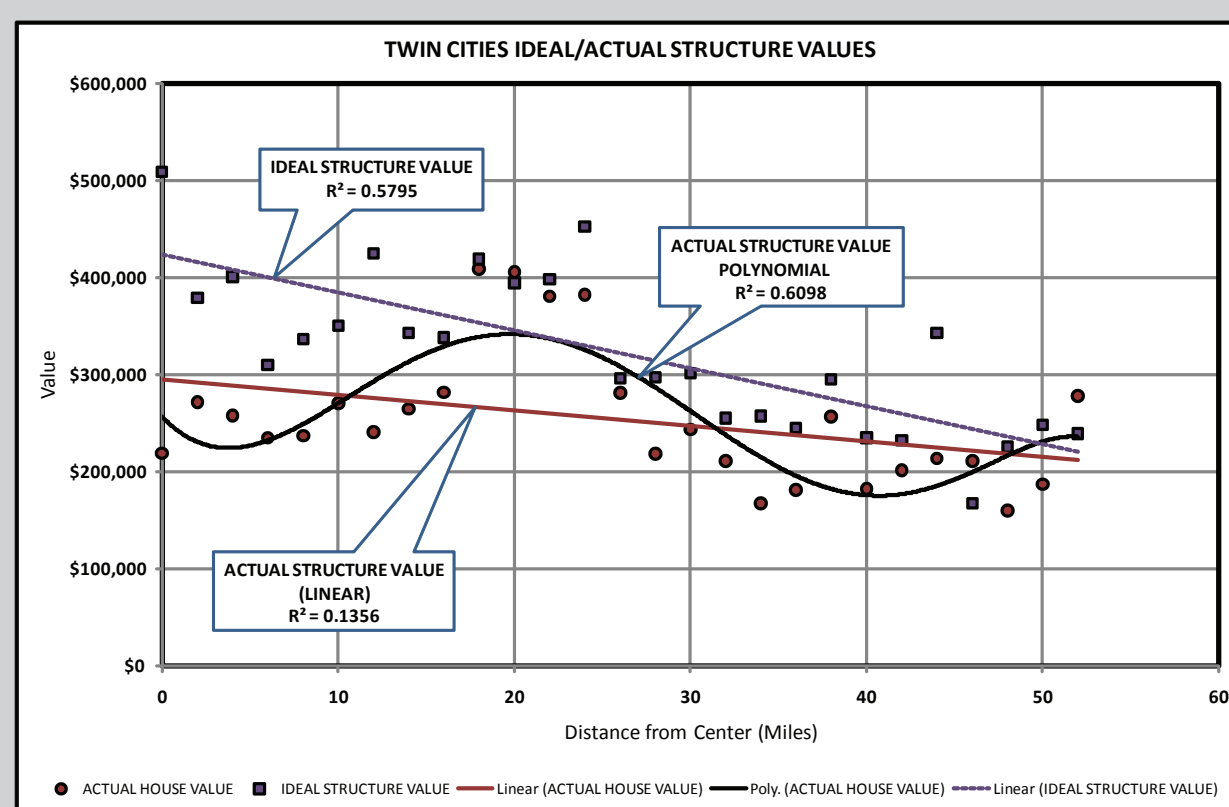
The "ideal" band (highlighted in the graphs at right) represents the highest priced housing (structure value plus lot value). The averages for this band were used as the "ideal" structure and lot sizes desired by the "average" home purchaser.

The graphs are strikingly similar. The ideal band for both cities lies between the 18 and 26 mile points, with San Diego having a slightly narrower band of only 20 to 24 miles distance from the city center.

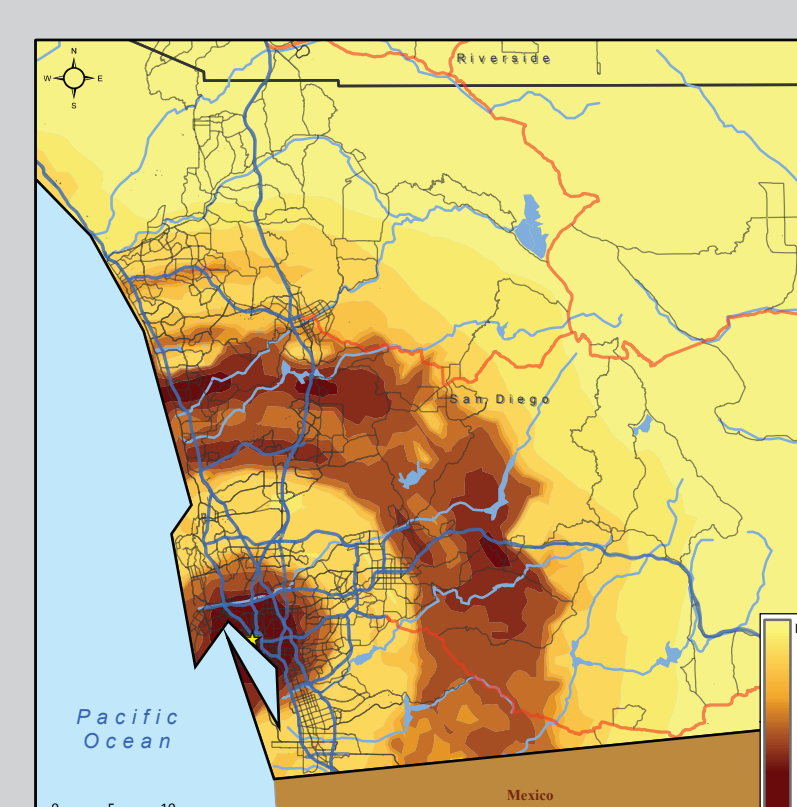
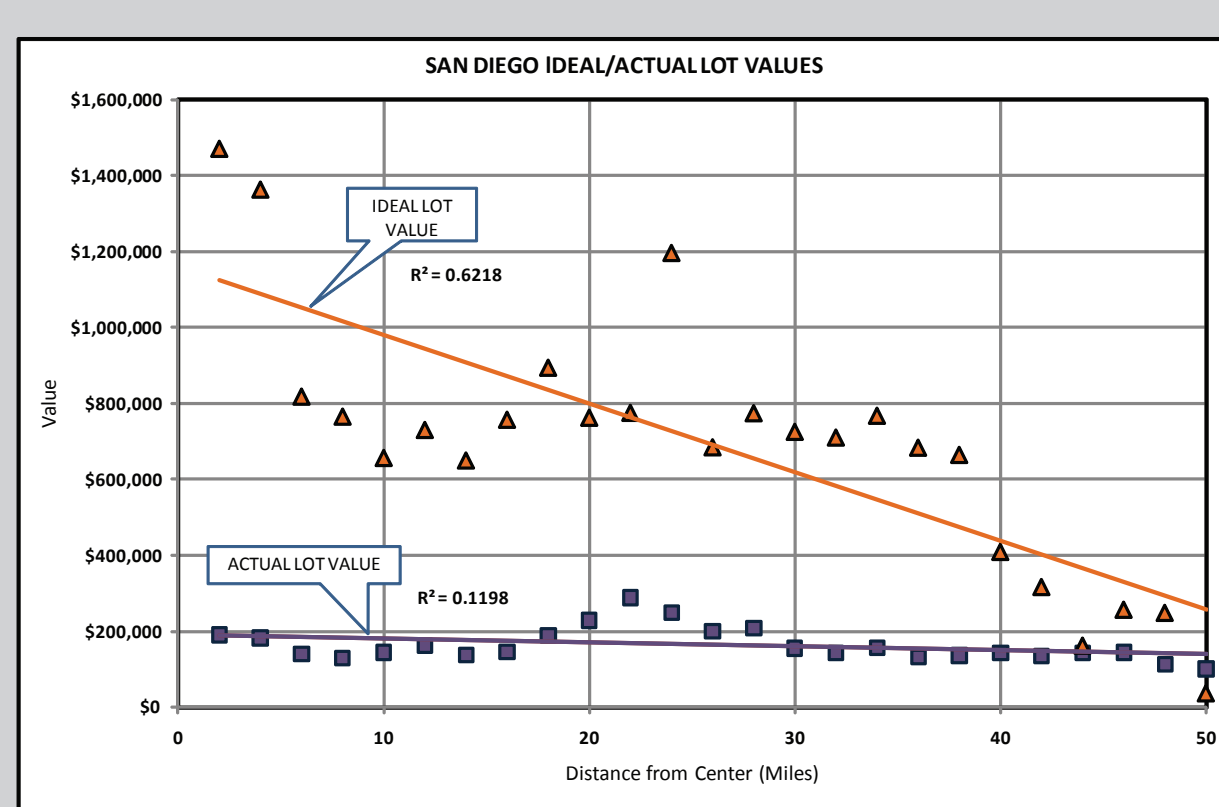
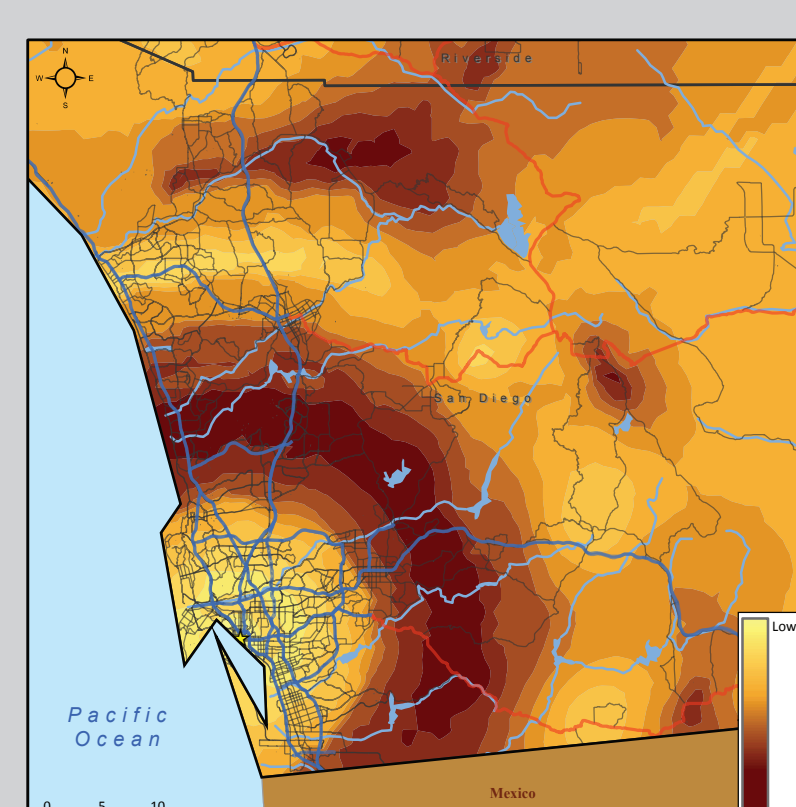
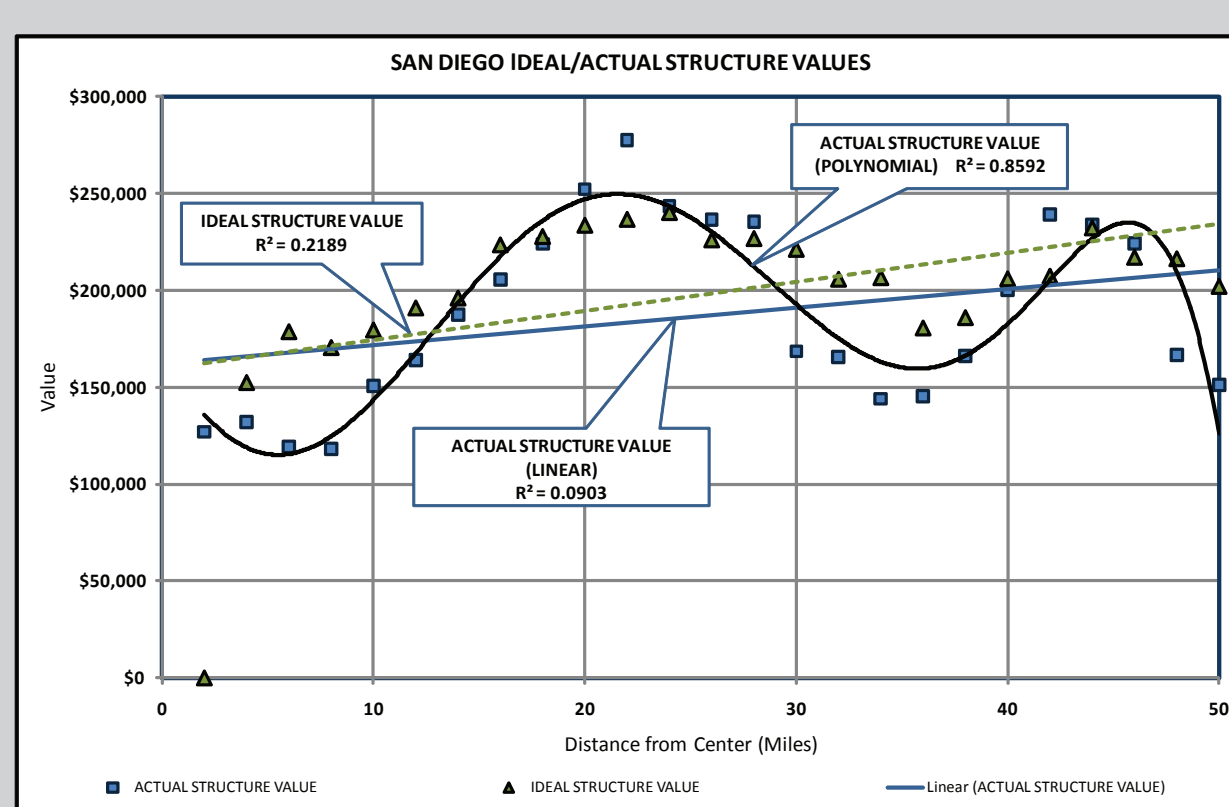
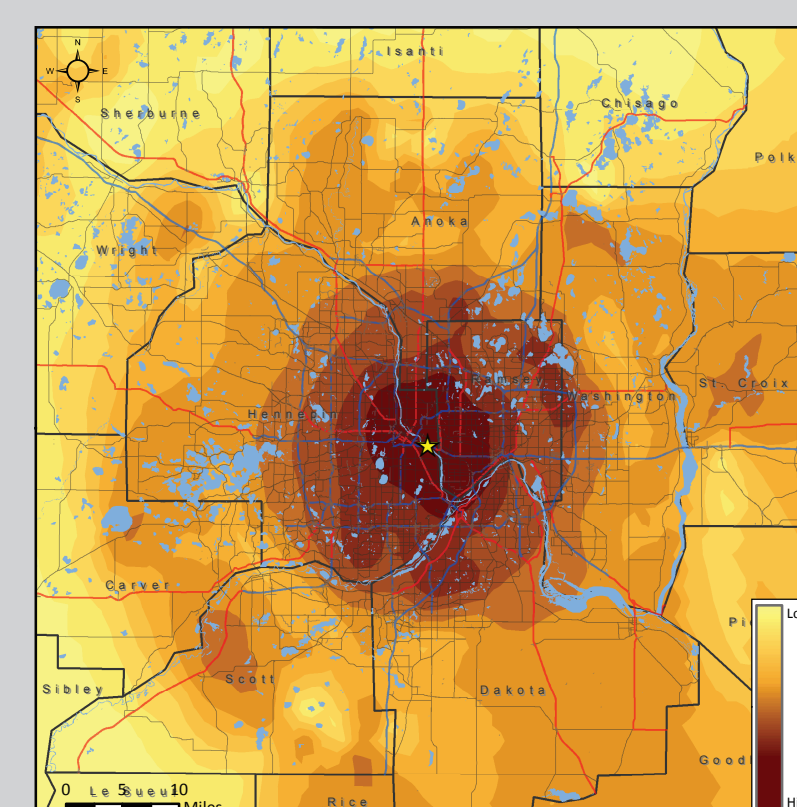
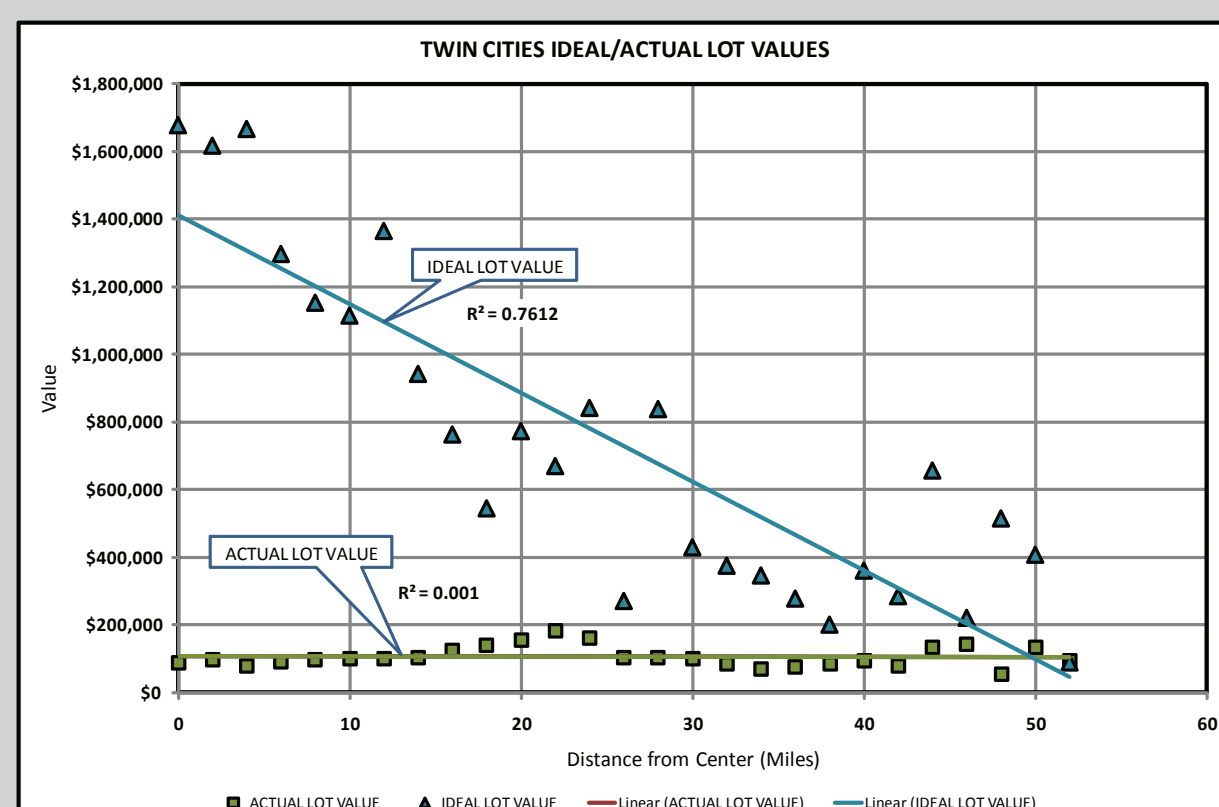
Along with the location of the bands, the ideal house size is also similar between the two areas. Ideal house size for the Twin Cities is slightly larger, possibly related to historical trends in housing sizes and the age difference between the cities. Ideal lot size between the two cities is very different, however, with ideal size near San Diego being more than three times smaller than the Twin Cities.



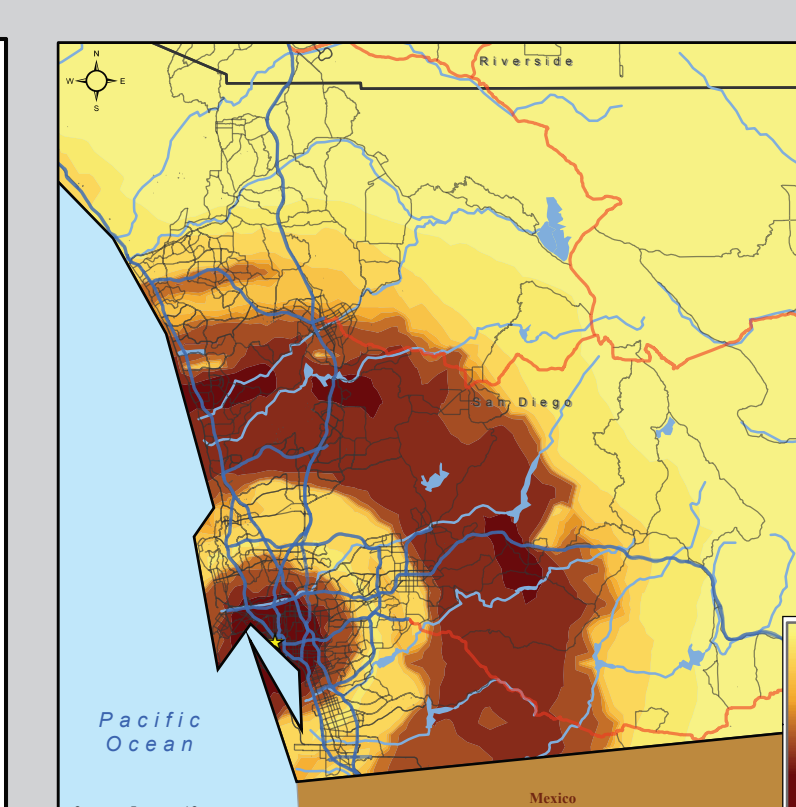
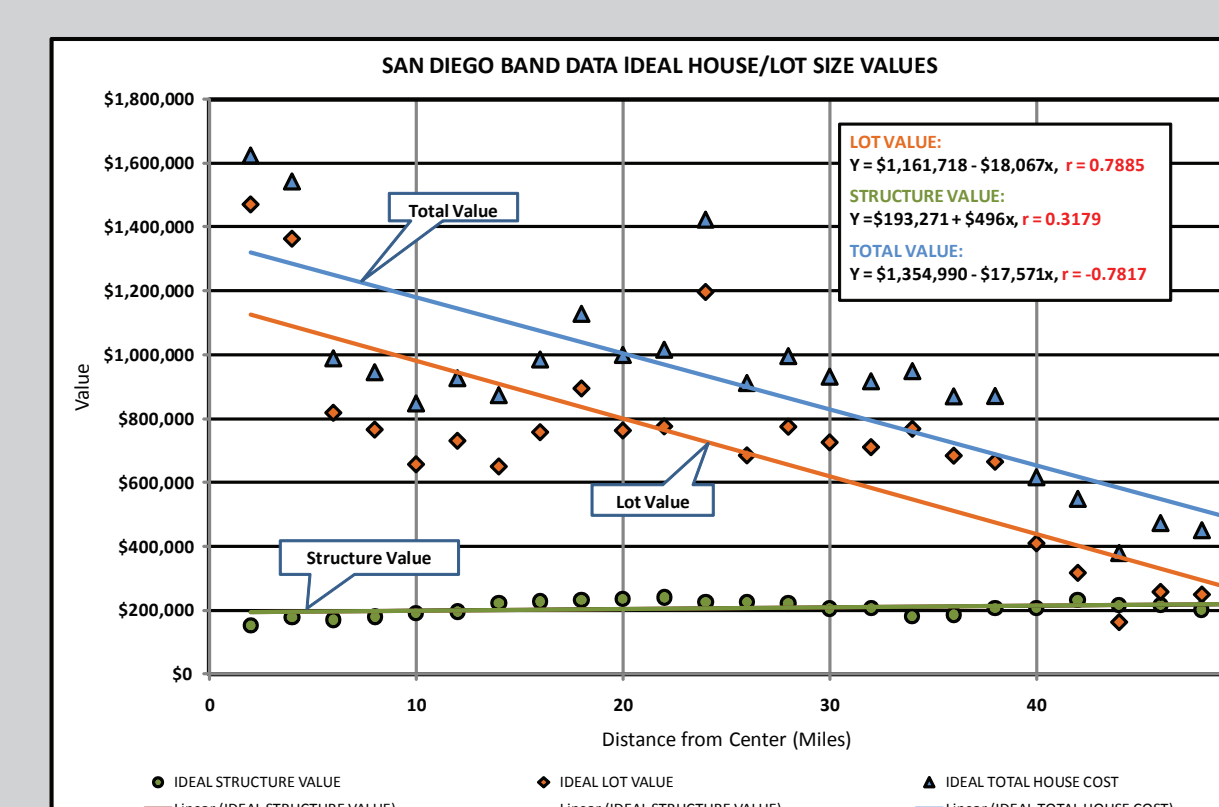
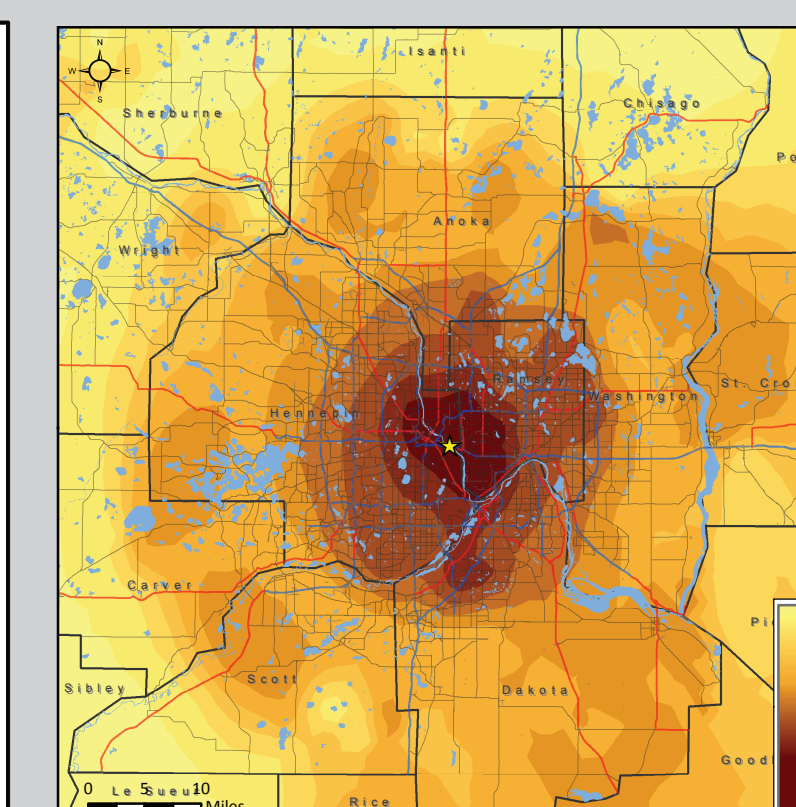
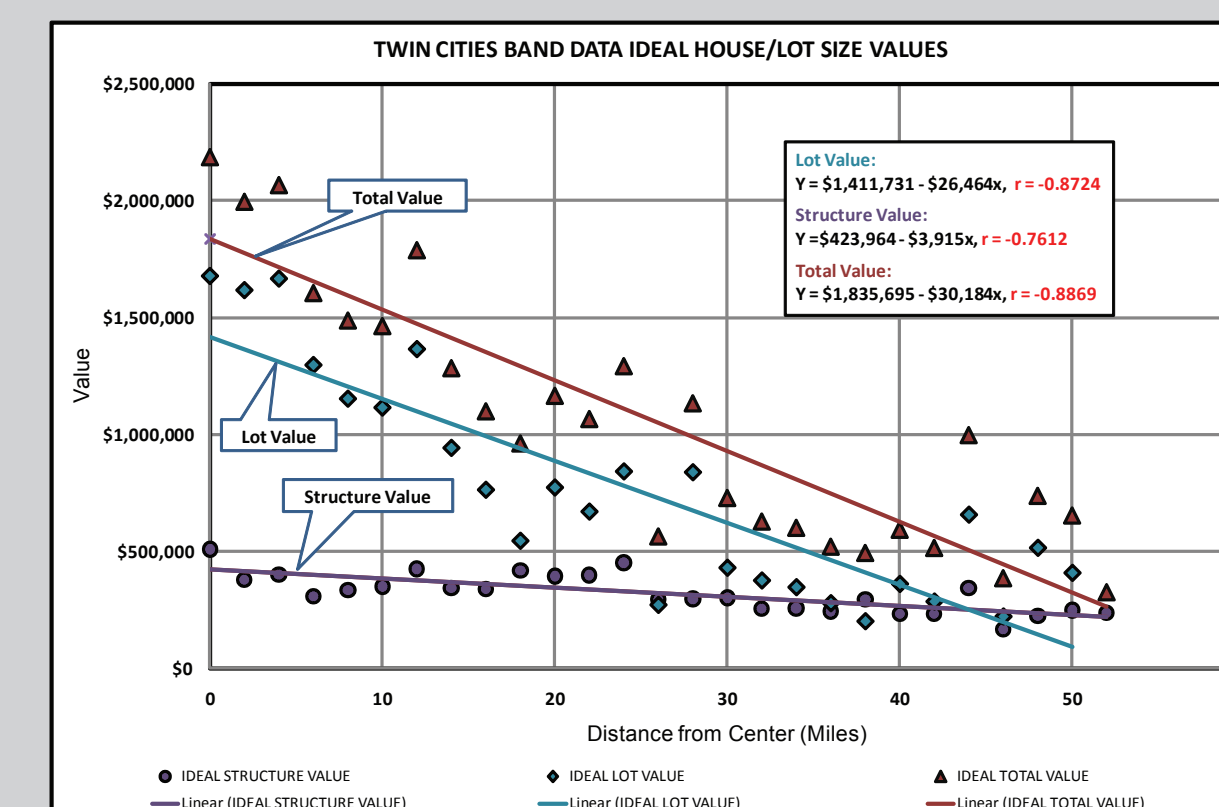
### Ideal Structure Value



### Ideal Lot Value



### Ideal Total Value



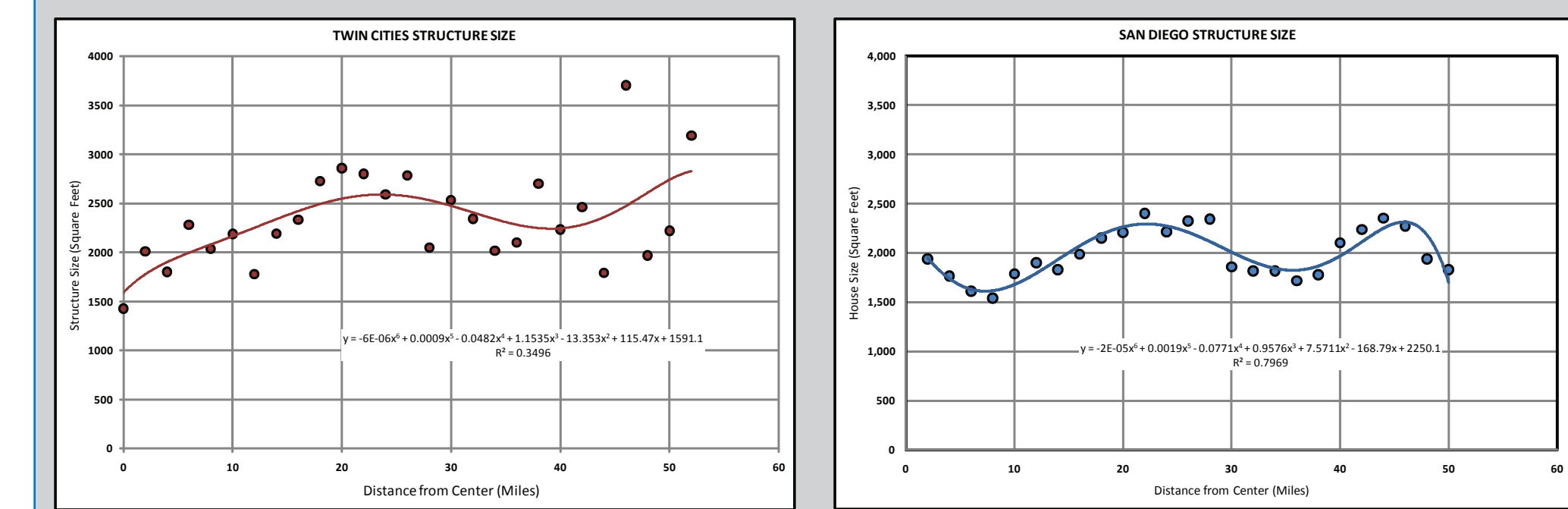
Ideal house value equals the "ideal" size (2,750 sq. ft. for the Twin Cities and 2,300 sq. ft. for San Diego) multiplied by the average price per square foot in each band. The graph above shows the actual structure value versus the ideal structure values. The results for both cities correlate strongly with the structure value cost per square foot maps above. This indicates that the expected/ideal value is very close to the actual value.

The above graphs show the actual lot value compared to the ideal lot value. Ideal lot value is calculated by multiplying the price per square foot in each band by the "ideal" lot size, determined by averaging the average lot sizes in the "ideal band" (2.7 acres for the Twin Cities, .83 for San Diego). These average lot sizes were applied to all data points for each area and are shown in the maps above. If the ideal lot size was found at the center of the city, it would be expected to cost nearly \$1.2 million in San Diego and \$1.4 million in the Twin Cities.

Ideal total value is a combination of the ideal lot value and ideal structure value. The above graphs show the total value trendlines and the lot value trendlines to be roughly parallel. The maps of ideal total value look strikingly similar to the ideal lot value maps, suggesting that the lot value plays a major role in the "drive until you qualify" hypothesis.

## Size Analysis

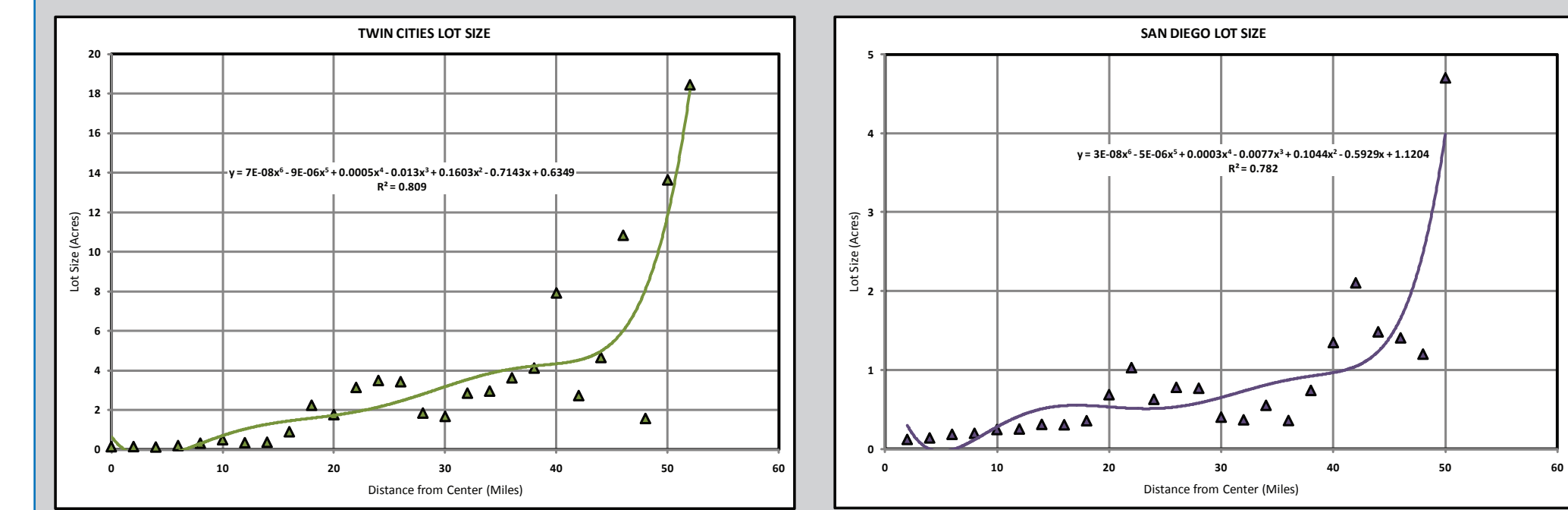
### Structure Size



In the Twin Cities area, structure size is small in the center of the city and gradually increases with distance until it reaches a peak of about 2,600 square feet at approximately 24 miles. The structure size then takes a downward shift until it reaches a distance of 50 miles at which point it begins to increase again. The sixth order polynomial equation for distance and structure value "explains" roughly 35% of the variation in structure size.

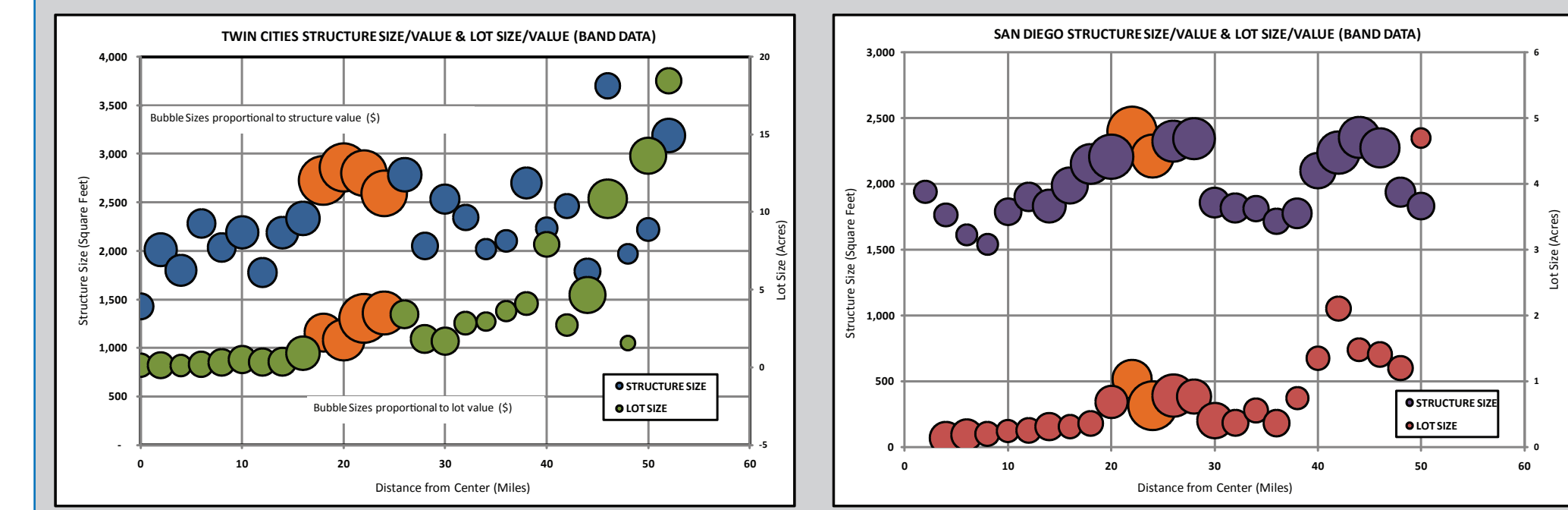
The trend is not exactly the same in San Diego. Structure size remains more constant as distance increases, varying by less than 1,000 square feet, as opposed to over 1,500 square feet in the Twin Cities. The peak structure size is about 2,300 square feet in San Diego, and it occurs at a distance of approximately 22 miles from the city center.

### Lot Size



Lot size is very small in the center of both cities due to high demand and high population density. In both cities, lot size gradually increases with distance until approximately 45 miles away from the city center. At this point the lot size begins to increase dramatically. The sixth order polynomial equation for distance and lot size "explains" roughly 81% of the variation in lot size for the Twin Cities, and 78% for San Diego.

## Structure Size vs. Lot Size



These "bubble" graphs show both structure size and lot size while also demonstrating the variation in value of the two variables by bubble size. The graphs are, again, strikingly similar in shape. These graphs clearly illustrate the differences between the cities in the relationship between house size and lot size. In San Diego, lot size is consistently varied from structure size, while in the Twin Cities region, the difference between the two lessens with distance from the city center. Also apparent are the ideal bands in the two areas, indicated in orange on both graphs. The similarity in location and size is quite apparent on this type of graph.

## Results

The research clearly indicates that the total cost of a house and lot is driven by cost of the land, not the structure cost. For both San Diego and the Twin Cities metropolitan area, the relationship between land value and distance from the city center is very strong. This research indicates that the "drive until you qualify" theory holds true for both land locked cities as well as coastal cities. The thesis, however, must be modified by the fact that the price alone is not the primary factor. The majority of potential home buyers desire a specific size home on a specific size lot (representing the "Leave it to Beaver" suburban ideal). This combination can be found at a middle class price mostly in the 20-24 mile bands, slightly closer and further in the Twin Cities. This is the point where land prices have declined enough (distance from the city center) to make the ideal lot affordable. The curious results of this research certainly pose additional questions about housing and land values such as: What other factors drive these values? Could the trend be found in other cities of differing sizes? Could the trend be the same in other counties? What economic factors in the city would alter the results? These questions pose as a starting point for continued research on the topic.

## References

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