

California State University Northridge

A Geographic Study of Motorcycle Theft
in Los Angeles County

A thesis submitted in partial fulfillment of the
requirements for the degree of
Master of Arts in
Geography, Standard Program

By
Mark Marshall

December 2017

The thesis of Mark Marshall is approved:

Regan Maas, Ph.D.

Date

James Craine, Ph.D.

Date

Steve Graves, Ph.D., Chair

Date

California State University, Northridge

Acknowledgements

To my friends and family for their love and support, I thank
you so much for your guidance and patience,

To my university professors and fellow students,
I thank you for your wisdom,
integrity and humor,

To Frank Scafidi of the National Insurance Crime Bureau,
without whose help, this research would have
been much more difficult or impossible,

To the law enforcement officers doing a dangerous and
difficult job, I thank you for your service,

To my fellow motorcycle riders, I wish you enjoyment,
safety, and hope you never endure the violation of theft,

And lastly to my beautiful wife Erica, thank you for the
late night meals, kind words and unwavering
faith in my endeavors.

TABLE OF CONTENTS

SIGNATURE PAGE	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	v
CHAPTER 1: INTRODUCTION	1
BACKGROUND AND SIGNIFICANCE	
RESEARCH QUESTION AND HYPOTHESIS	
CHAPTER 2: LITERATURE REVIEW	4
MOTORCYCLE INDUSTRY TRENDS	
CRIMINAL ACTIVITY	
ANTI-THEFT PREVENTION	
CRIMINAL APPEAL	
CHAPTER 3: METHODOLOGY	12
DATA	
ANALYSES	
MEASURES	
VARIABLES	
CHAPTER 4: RESULTS	16
SPATIAL ANALYSIS	
OLS REGRESSION ANALYSIS	
GEOGRAPHICALLY WEIGHTED REGRESSION ANALYSIS	
CHAPTER 5: DISCUSSION	21
SUMMARY OF FINDINGS	
STUDY LIMITATIONS AND FUTURE RESEARCH	
POLICY IMPLICATIONS	
CONCLUSIONS	
REFERENCES	34
APPENDIX: MAPS	30

Abstract

A Geographic Study of Motorcycle Theft in Los Angeles County

By

Mark Marshall

Master of Arts in Geography, Standard Program

Motorcycle theft, as a topic of study, has been predominantly studied in conjunction with automobile theft but not as a stand-alone issue. The motivations and rationalization of criminals committing property crimes may be similar, but it is the goal of this research thesis to illuminate more specific reasons why thieves target motorcycles. The study is of increased significance in California and Los Angeles County. California has been ranked the number one state in motorcycle theft for years, and Los Angeles County specifically has more thefts than most states. This paper seeks to analyze the demand for motorcycles, criminal methodology, and the social and environmental variables helping to facilitate theft. Through geographic visualization and statistical regression evaluation, this thesis will attempt to isolate the most factors that have made Los Angeles County one of the most precarious places to own a motorcycle.

CHAPTER 1: INTRODUCTION

Background and Significance

Since the early 20th century, when manufacturers such as Harley Davidson, Norton and Indian began to produce motorcycles for civilian use, there has been a true American love affair with the motorcycle and a crafted image around those who sought to ride. When the post-World War II baby boom caused massive migration out of the inner city, new roads, freeways, and highways were being built to accommodate the growing suburban sprawl. The lack of or purposeful decline of public transportation in Southwestern states like California, Arizona and New Mexico led to an incredible spike in the production of automobiles and motorcycles, facilitated by the manufacturing capabilities of American capitalism.

Motorcycles provided something to the newly returning veterans of WWII that was missing in the “June Cleaver” age of the late 1940’s and early 1950’s. The camaraderie, excitement and high element of danger in motorcycle riding appealed to the returning veterans as an escape and a constructive and creative outlet for their stress and mechanical aptitude. Much like automobile culture, motorcycles were customized, enhanced, and paraded as statements of masculinity and self-expression. Clubs were formed both for legitimate riding companionship and illicit activity, or morphed over time into one or the other (McIntosh, 2013). To give an example, The Hell’s Angels and The Outlaws, two very large and well-known motorcycle gangs in the United States, were started as legitimate clubs in 1935 and 1948. These and several other notorious motorcycle ‘clubs’ have been dubbed as “one-percenters”, a taunt to the other supposed ninety-nine percent of riders that obey the law (Brickell & Cole, 1979). Pop culture icons like James Dean, Elvis Presley, and Marlon Brando and the success of the films like “*Easy*

Rider” and “*The Wild One*” helped to solidify the image of the rugged, confident, free-spirited motorcycle rider on the other side of the law (Aamidor, 2009).

No matter the origins of motorcycle subculture, ownership, cruising, and motorcycle-related events have only gained popularity in the United States and continues to rise. The Sturgis Rally, an extremely popular event held in South Dakota, hosts thousands of motorcycle enthusiasts and riders every year, and despite several large incidents of violence does not seem to be losing appeal (McIntosh, 2013). According to the United States Department of Transportation Bureau of Transportation Statistics, the number of street legal motorcycles registered rose from 260,000 in 1997 to 892,000 in 2006 (a 243 percent increase), but declined slightly to 885,000 in 2007. As opposed to the late 1940’s through the 70’s, the predominate type of recreational bike in the United States shifted from the larger, less maneuverable street cruisers like Harley Davidsons to the smaller, and nimbler Japanese sport bikes produced by Yamaha and Honda (McIntosh, 2013).

Motorcycles have highly influenced American culture. The rise in motorcycle theft in recent years goes can be attributed to not only to their visual appeal and availability, but also the amount of innovation that has taken place in motorcycle technology. Unfortunately, there is very little that has changed in terms of security, and law enforcement’s attitude towards motorcycle theft is also colored by motorcycle culture. The relevance of this study holds weight not only for riders. It also heavily impacts insurance companies that are forced to pay millions of dollars a year for unrecovered bikes, law enforcement’s image of competency, enforcement, and the prevention of crime, manufacturers’ and dealers’ sales, and the public’s general safety and peace of mind in where they leave their possessions.

As both an avid motorcycle enthusiast and a target of two motorcycle thefts, the focus of this thesis is both academic and personal. After conversing with several other victims, there was a need to understand the criminal motivation, any discernable patterns, and preventative measures available to combat motorcycle theft. Besides bikes being a practical (albeit dangerous) mode of transportation, from a subjective point-of-view, they are also an extension of the rider's persona. One of the most infuriating feelings about having a motorcycle stolen is not only that the prized possession is gone, but the thief shares your enthusiasm for riding.

Research Question and Hypothesis

This thesis explores several hypotheses about motorcycle theft. First, that perpetrators of the crime are most likely young men, and looking sell motorcycles in whole or in parts. Second, that thefts will be concentrated in lower income areas. Motorcycle ownership in lower income areas is most likely higher because they are a cheaper alternative to a car, especially in places like Downtown Los Angeles where parking and space are at a premium. Those same residents may not have access to or be able to afford deterrents like surveillance, gated parking structures and full-time security officers. Third, this thesis would like to explore if there is any demographic connection to motorcycle theft. Motorcycle theft can occur anywhere and everywhere, however, it would be more difficult for a crew of minority thieves to locate and steal from an upper-middle class White neighborhood, and vice versa. This leans towards motorcycle theft being an intercommunity problem as well. Fourth, the proximity to auto body shops and major freeways will most likely be major indicators of where motorcycles are stolen. Thieves need quick access to and from their targets, and once obtained, an inconspicuous place to conceal it. Last, motorcycles theft will be most likely concentrated in densely populated areas.

CHAPTER 2: LITERATURE REVIEW

Motorcycle Industry Trends

The popularity of international sport bike races and a decline in the membership of large cruiser gangs like The Hell's Angels and The Outlaws due to graying and federal crackdowns were some of the reasons why the Japanese bikes overtook the motorcycle market. Another was the innovation of technology put into sport bikes (McIntosh, 2013). Kawasaki was the first to introduce fuel injection technology into motorcycles in 1979, followed closely by Honda with electronic fuel injection in 1982. This was breakthrough innovation since riders now did not have to wait as long for engine warm-up or adjust the 'choke', a device that calibrated the air-fuel ratio for idling and performance in carbureted engines. It also equated to better fuel economy and performance, which translated into more sales and popularity. Add in a fantastic marketing campaign distancing the newer Japanese bikes from the 'bad-boy' Harleys not two decades earlier, and you have a winning combination (McIntosh, 2013).

The new Japanese sport bikes' racing heritage was also spurred by World War II technical expertise. Japanese engineers were not allowed to research or develop new armaments or equipment specifically for military use, which translated into other sectors such as private electronics, cars and motorcycles. Since the aerodynamic principles of planes and super sport motorcycles are very similar, Japanese-made bikes came to dominate the racing world, and still do to this day. Yamaha, Suzuki, Honda, and Kawasaki are often referred to as "the big four" and are the industry standard in many innovations and engineering breakthroughs (Aamidor, 2009). The dominance of the market combined with the technological innovations has created a supply

of highly desirable vehicles and a demand for modifications, parts, and engines. That demand along with other variables has facilitated the rise of motorcycle theft around the world and in Los Angeles County (Fleming, 2017).

Criminal Activity

Two renowned criminologists, Clarke and Felson, have theorized that most products go through four phases of criminal desirability. Those stages are innovation, growth, mass market, and saturation (Hart & Lersch, 2011). When a product initially is produced in the innovation stage, it is often difficult to use or has many issues with reliability. In the growth stage, it is expected that thefts will rise because of familiarity and user accessibility. In the mass market stage, the desirability of the product reaches a zenith both in popularity, convenience, and appeal (Hart & Lersch, 2011). Motorcycles now have anti-lock braking systems, faster liquid-cooled engines, variable suspension modes, corrosive-resistant parts, and more computer controlled mechanics. Yamaha's 2015 R1 M even has built-in WIFI to synchronize performance adjustments to the rider's cellphone. Of course, bikes with this kind of technology hold a massive appeal to thieves. The saturation phase, however, states that as the market becomes flooded with the product, thefts inevitably reduce since it is no longer providing the same reward. Los Angeles County is saturated with high-end sport bikes and cruisers. What are the factors that driving this rise?

Another crime theory called the displacement, or diffusion of crime, may explain the continuing rise in motorcycle theft rates. When it comes to organized theft, rational choice theory states that criminals will weigh benefits of crime against rewards and punishments. When a certain criminal activity becomes too risky or the rewards too insignificant, perpetrators naturally will move to other ventures, which is a phenomenon described in the context of displacement

theory (Hart & Lersch, 2011). Although automobile theft is still a significant issue, recent manufacture security features like push-button starters and laser-cut keys have made theft of modern cars nearly impossible for anyone but the most professional thieves. Global position system trackers such as ONSTAR, alarm systems, and cut-off switches that can be triggered from smart-watches have also put the power of anti-theft into the hands of the consumer in an unprecedented fashion.

Since perpetrators of illegal activity seek the highest reward for the least amount of risk, they move on to easier, and sometimes more lucrative criminal endeavors, until factors change back to their favor or they find a way to minimize danger to themselves. A key example would be the enacting of helmet laws in Australia and the U.K in the 1970s and the affect it had on motorcycle theft. Motorcycle theft dropped exponentially in both regions (for a short time) because thieves had to ride with helmets or risk being caught by authorities (Hedayati, 2008). Although, it would be a nominal cost to a motorcycle thief to buy or steal a helmet, it added effort to the criminal endeavor by its enforcement. Thieves not in compliance with law were more visible and prone to be stopped, but were also slightly encumbered by having to carry a helmet to the scene of their next crime. A person walking up to a motorcycle from a van or a long distance from where the motorcycle is parked is exposed for a longer period, and therefore runs a greater risk of discovery or capture (Hedayati, 2008). Nevertheless, not all measures of crime can be accounted for and not all crimes or criminals follow a discernable pattern; a thief that normally commits identity theft may shift to grand theft auto if the opportunity is available (Clarke & Weisburd, 1994).

Anti-Theft Prevention

Debate has been raised about having the liability of auto theft prevention fall upon the insurance companies, automakers, or upon the individual consumer (Field, 1993). One of the arguments about making security the sole responsibility of the automaker is that disproportional value of the vehicles would also lead to disproportional security measures between higher and lower cost vehicles. Makers of cheaper cars would face dwindling sales and financial liability because the security measures are easier to bypass than the measures equipped on more expensive vehicles. However, in our system of third party insurance liability, there may be less incentive to protect the original investment if someone else is going to cover the cost of theft. It also makes insurance premiums rise to sometimes burdensome rates, and leads insurance companies to become unfairly judgmental about the events and amounts of coverage they offer to offset their own liability (Field 1993).

Specific task forces made of deputy attorneys and law enforcement specialists have made a tremendous impact on the rate and frequency of auto theft, as well providing training for spotting stolen property. There has also been a need to standardize coding of vehicle identification numbers across state borders, as thieves will often duplicate or forge new VINs and take them across state lines to sell, or flip salvage titled cars for a profit. As of July 2008, the NMVTIS, or National Motor Vehicle Title Information System, allows DMVs and law enforcement agencies from different counties and states to immediately check for fraudulent VINs, reported thefts, title washing (selling salvaged vehicles) or insurance scam red flags (Lyons & Teigen, 2008).

However, from both logistical and technical standpoint, motorcycles are much easier to steal than cars. Even high-end motorcycles come with few anti-theft features beyond the standard wheel-lock ignition switch. An unchained, un-alarmed, motorcycle without G.P.S. technology is

easy pickings for even novice thieves. Sport-bikes weighing less than five-hundred pounds can be hoisted into a truck or cargo van within seconds by one or two capable persons and they are easily concealed almost any space where someone can fit or transport them (Hedayati, 2008). Also given the anonymity afforded to riders with full-face motorcycle helmets, potential thieves can also move freely on stolen property without raising much suspicion. Given enough time and the right tools, a professional group of thieves can steal about anything, but being able to move and conceal the prize is what sets motorcycle theft aside as a lucrative alternative (Siler, 2013).

Criminal Appeal

Despite the sale of cars or motorcycles in part or whole, there is the illicit market of vehicles specifically for committing other crimes as well. Criminals seeking cars for heists or drive-by shootings are willing to pay for anonymity and there is often pure profit to be made on the other end for thieves. There has been a recent push for collaboration between law enforcement and insurance companies to identify fake vehicle identification numbers, track salvage vehicles for resale and provide information on make and model vulnerabilities or highly desirable cars for theft (Lyons & Teigen, 2008).

Unfortunately, the same dedication remedying car theft in the U.S. has not translated to motorcycles, and the attitude towards them continues to facilitate their loss. Declining membership and influence in motorcycle gangs and clubs has not driven down the demand for the machines. The primary consumer and target audience is the 18-25-year-old American male, a demographic that craves both speed and attention. In many social circles, motorcyclists are seen as reckless, dangerous, disrespectful deviants that skirt or blatantly ignore the laws of the road and society in general (Crundell et al., 2007). Motorcycles are loud and very fast, obnoxious to the everyday driver and pedestrian, leaving little sympathy for when they are taken and are less

likely to be reported stolen by neighbors or bystanders. Motorcycles are also primarily a recreational mode of transportation (in the United States) therefore, law enforcement and the public view it as an individual inconvenience not an urgent problem.

Outside of tangible monetary rewards, auto thieves continue illegal behavior for other reasons. There is also an increased duration of the original thrill of the crime by driving a stolen vehicle, a feeling of ‘getting over’ on the system of deprivation, and the respect of the people who are also involved in the activity or as a role model for other disenfranchised. Fast money quickly overrides the tedium and less lucrative appeal of legitimate work, and although the money awarded versus the risks does not appeal to the average middle-class person, vocational options are highly limited for most offenders (Copes, 2003).

Money received from illegal means is usually spent much faster because criminals did not have to work as hard for it, and feeds into the drug habits of many offenders (Siler, 2013). Not being able to hold down a legitimate job combined with a general disdain for authority in the community makes theft a viable option. Auto and motorcycle theft also awards the participants an unparalleled amount of geographic freedom; a vehicle that fits the lifestyle that they aspire to, and to also a broadcast to the ‘street’ that they have a certain amount of prestige and ability. For young men aged seventeen through the early twenties, a vehicle has been deemed nearly necessary to one’s status and outlook on life, which is exacerbated by the poverty and lack of opportunity in many urban neighborhoods (Copes, 2003).

The geographic layout of Los Angeles County also makes it an area that is conducive to motorcycle theft. Freeways crisscross most of the county, and winding canyon roads are plentiful, giving ample escape and logistical routes to both joyriders and professional thieves. The county is also easily navigated, especially in the larger, grid structured areas of the San

Fernando Valley. There are many industrial and automotive commercial spaces, where ‘chop shops’ go largely unnoticed by law enforcement. Proximity to Mexico, where many parts and bikes end up, is also key for the illicit business (Siler, 2013).

As stated by many criminologists, there is a comfortable distance in which criminals operate, based on several factors. Immediacy to their home and or places of business may lead to discovery, as people are more cognizant of their surroundings closer to their place of dwelling and may notice illicit activity more readily. Too far of a distance from a place of familiarity, and criminals may become disoriented and unable to execute escape routes (Hart & Lersch, 2011). Distance from a target also means distance from concealing stolen goods, and the more time a criminal spends out in the open, the more likely the probability that they will be caught (Siler, 2013).

Other elements of Los Angeles County’s geography make it a hotspot of motorcycle theft. A highly diverse range of socioeconomic status in Los Angeles County helps to fuel the illegal market as well. Wealthy communities are backed up against poorer communities, and therefore criminals have a buffet of higher end and midrange sport bikes and cruisers to choose from in a relatively small area. Los Angeles County is a one stop shop for consumer demands and theft selection. Additionally, Los Angeles and California have some of the longest and driest summers in the nation, making riding a nearly year-round pastime. That means the demand for parts and bikes is not as much a seasonal phenomenon as it is in other places in the country or the world, (Hedayati, 2008) and thieves can operate and turn profits longer than their colleagues in other areas without disruption to business.

Consumers are not likely to buy goods and services or purchase or lease property in areas where their vehicles are deemed unsafe. Insurance company premiums also inhibit to a lesser

degree the area where people will move, based on the amount of theft. Insurance companies, businesses, and not surprisingly, auto sales companies suffer greatly besides the victim himself, who suffers emotional trauma but also loss of money, time, and personal inconvenience for what may times amounts to a joyride (Rengert, 1997).

CHAPTER 3: METHODOLOGY

Data

To conduct the study, only motorcycles over 50cc engine sizes were considered. Theft data, including the location information, was downloaded for the 2013-2015 calendar years from the Los Angeles County Sheriff Department and Los Angeles Police Department's data portals (lasd.org, data.lapd.org). Each theft was geo-referenced by city block and nearest cross street. Los Angeles Police Department data was also geo-referenced; however, grand theft data of motorcycles was combined with other recreational vehicles which made the use of their data more difficult. Counts of motorcycle thefts that occurred within divisions were obtained from the National Insurance Crime Bureau (Scafidi, N.I.C.B Report, 2016). Theft incidents were extracted *at random by division for each respective year.*

Analyses

Several tests were used within this study for various reasons. The kernel density test was used to give a better visual representation of how numerous thefts were in certain areas, facilitating immediate graphic recognition of troubled regions. Over the study years, thefts may occur in the same place, making the plotted theft points a visually unappealing and less representative map. ArcMap GIS can geographically 'stack' incidents of crime that occurred within the same census block. A kernel density or 'hot-spot' analysis shows the higher crime areas of the county by assignment of these points to a color ramp scale from light blue to dark blue.

The average nearest neighbor index was calculated to determine the likelihood that the thefts were occurring in random locations. This statistical tool is important because geographical incidents like theft, that occur in non-random patterns, suggest that there are other variables or factors at work and that they are causing the pattern. Last, ordinary least squares regression, (OLS) in addition to geographically weighted regression, (GWR) was used for statistical geographic analysis. Regression statistics are one of the most effective tools to calculate how one variable is being affected by other factors, and determines the strength of relationships by using a constant statistical function to calculate the value of the dependent variables on the independent variable. This statistical value is called a coefficient, and the higher or lower numerical value or whether it is positive or negative demonstrates the strength and relationship (direct or inverse) of the dependent variable on the independent variable. Geographically weighted regression (GWR) does works in a similar way as linear regression, (OLS) with one key difference. GWR uses the same variables as any other linear regression, but calculates the same relationships within a *specific geographic area*. In this analysis, those specific areas are census tract polygons. GWR allows the researcher to make more detailed inferences at a local scale as opposed to simple linear regression. Los Angeles County theft rates were weighed against demographic and socioeconomic data to make predictive arguments on how likely a motorcycle will be stolen within a given area.

Specifically, the OLS model used in this analysis was noted as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12}$$

Where X_1 = Percent White, X_2 = Percent Black, X_3 = Percent Asian, X_4 = Percent Hispanic, X_5 = Population Density, X_6 = Median Household Income, X_7 = Percent Male 18-21, X_8 = Percent Male 22-24, X_9 = Percent Male 25-29, X_{10} = Percent Male 30-34, X_{11} = Average

Distance to Highways, and X_{12} = Average Distance to Auto-Body Shops, for each census tract in Los Angeles County.

Measures

With a large study area like Los Angeles County, there are census tract areas where there are numerous thefts, and some places that none occurred. This is commonly referred to as a *skewed* dataset, where an imbalance of data occurs. A logarithmic transformation of the theft rate data was used to normalize the theft incidents distribution, to allow the data to function properly within the statistical tool. The logarithmic, or ‘logged’, pattern of the theft incidents included several demographic and geographic variables.

Variables

The percentage of White, Black, Asian, and Latino populations as well as males from the ages of 18 to 34 were considered for a predictive pattern with the census tracts. Thieves of several ethnicities were found participating in motorcycle theft (Nichols, 2015) and given that there is a high level of anonymity of motorcycle theft patterns and culprits, the predominant ethnicities within Los Angeles County were all included in this study.

Four other variables were added to the regression analysis as potential predictors of motorcycle theft. Clusters of auto-body repair shops, the most likely areas for ‘chop-shops’. Second, census median income data was also added as a layer to monitor the distribution of motorcycle theft based upon median household income. Higher-end motorcycles are logically going to be found in more affluent neighborhoods, making those areas more appealing for theft. Third, the average distance to freeways from each theft was also calculated. Another ESRI ArcMap tool called ‘generate-near’ finds what proximity an auto body shop or freeway is in

relation to the thefts. The generate-near tool then creates a chart indicating exactly how far each theft was from each of those geographic points. Thieves need to move their stolen goods quickly, as more time in the open risks more opportunity for apprehension (Hart & Lersch, 2011).

Distance to and from 'chop-shops' and highways would be a necessity for any motorcycle thief to be cognizant of. Last, the population density of each census tract was calculated by dividing the total area of each tract polygon by the total population. More densely populated areas logically may contain more targets and perpetrators for criminal activity.

CHAPTER 4: RESULTS

Spatial Analysis

The study results were obtained via observation of point data, kernel density analysis, observation of possible factors driving motorcycle theft, and economic and social factors that influence the variable studied. The relationships between these variables is illustrated through several maps of Los Angeles County and informational charts.

Figure 1.1

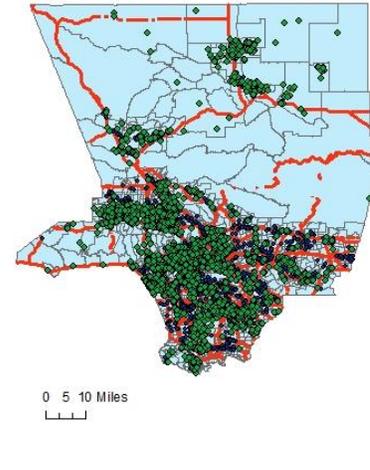
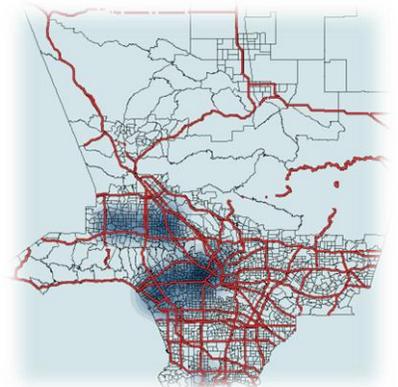


Figure 2.1



The pattern of theft was widely scattered across the study area. As illustrated in the first point map (Figure 1.1) the theft points align very closely with both major highways and in proximity of auto body shops. The kernel density maps (Figure 2.1 and Figure 2.2) show the highest recorded number of thefts occurring in the San Fernando Valley, through Downtown Los Angeles and the nearby marina communities, heavily in the Southgate, Compton, and Lakewood suburbs, into Long Beach, and then slightly less dense in the Santa Clarita Valley and Palmdale and Lancaster areas.

Figure 2.2



The theft point data was then processed through the ESRI ArcGIS spatial tool Average Nearest Neighbor (Figure 3.1). This spatial tool calculates the statistical probability that points within a certain area are appearing in relation to each other at random or if another factor or set of factors is influencing each spatial incident. A z-score below one standard deviation on a standard bell-curve indicates either clustered or dispersed patterns. With a z-score of -90.444790, there is very little statistical doubt that the pattern of motorcycle theft in Los Angeles County is clustered spatially.

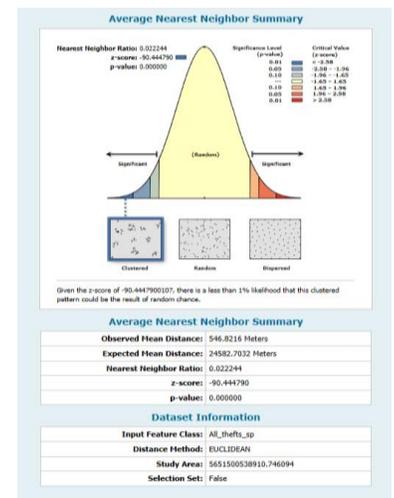


Figure 3.1

OLS Regression Analysis

Factors like race, gender and ethnicity were then used in an ordinary least squares (OLS) or regression analysis on the thefts from the L.A.P.D and Los Angeles County Sheriff reports. The logarithmic theft rate of both datasets was tested against the variables of White, Black, Asian, and Latino populations and the percentage of males in each area which were between the ages of 18-21, 22-29, and 30-34.

The factors only predicted roughly 8% of the logged motorcycle theft rate at the census tract level, even after the variables with the lowest coefficients (or strength) to the logarithmic theft rate were eliminated. OLS regression aggregates all the of the data into one statistical model and weighs the dependent variable against the independent variables with no differentiation of demographics or geographic variation between the census tracts (see Appendix 3).

Geographically Weighted Regression Analysis

In order to get a more local analysis of each census tract based on factors within each area, geographically weighted regression or GWR was used.

regression or GWR was used.

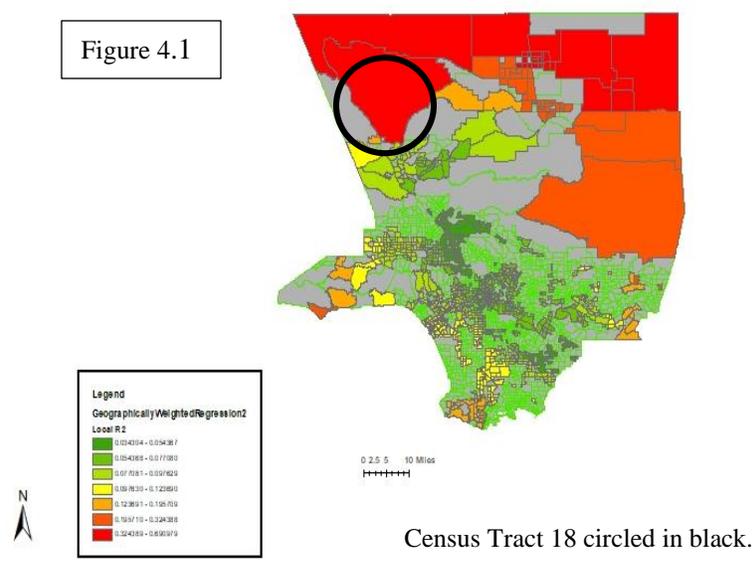
In order for the GWR to process, several variables had to be removed because of their multicollinearity, represented by the variance inflation factor score, or V.I.F. Scores above 7.5 are considered to be highly redundant and therefore, the

variables of White, Black, Hispanic, and Asian percentages as well as males ages 30-34 were taken out of consideration. However, given the aggregated factors of males aged 18-29, median household income, population density, distance to auto body shops, and distance to freeways, the GWR local R-squared values did predict up to 69% of the motorcycle thefts in one census tract (Figure 4.1). The lowest predictive local R-

squared values for the variables included were 3% on average (see Appendix 4).

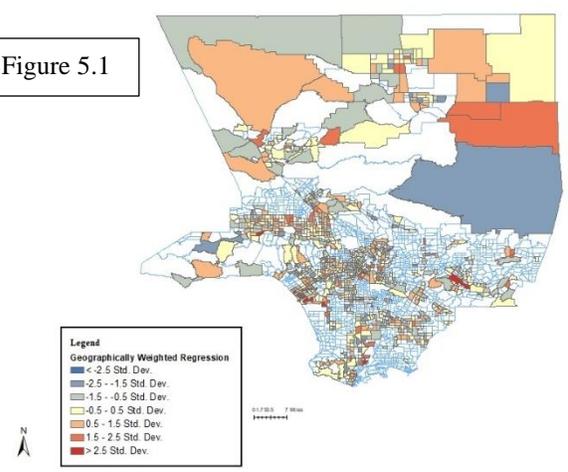
However, in the GWR, the census tracts that are shown in darker tan and red are the areas where, given the same factors, the theft rate is 1.5 to greater than 2.5 standard deviations more than surrounding polygons (Figure 5.1). Areas such as census tract 18 are geographically much

Figure 4.1



Census Tract 18 circled in black.

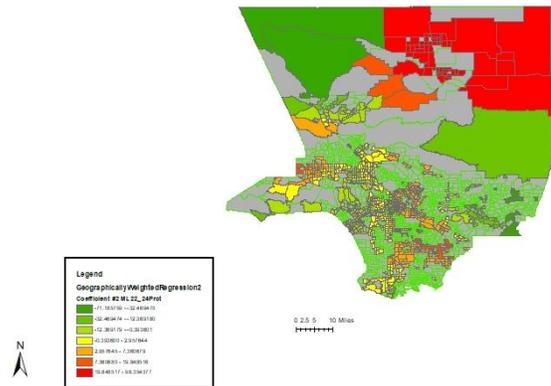
Figure 5.1



larger than most other tracts within the study. However, because larger tracts they have similar or higher theft rates in comparison to the smaller census tracts *given the other explanatory variables*, the local R-squared predictive value of the GWR increases. The more thefts that occur in a small area, the greater both the statistical value and perception of crime will be within those geographic parameters, but it depends highly on the explanatory variables presented.

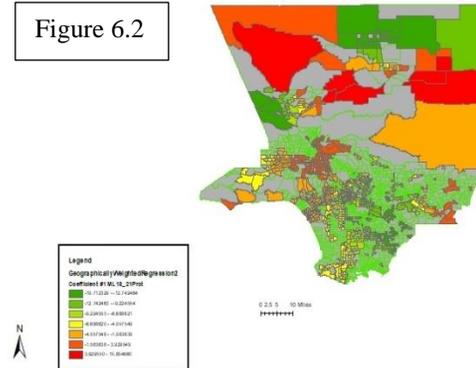
Regarding the coefficients, the highest positive values were among the male 22-24 and male 30-34 age brackets in the OLS regression and among the male 25-29 age bracket for the GWR in relation to the logged theft rate. Males in the 18-21 age bracket had an inverse relationship in the OLS regression analysis and low or inverse coefficients in the GWR. Population density had a consistently low positive relation to the logged theft rate in both the OLS and the GWR, and average distance to auto body shop clusters, average distance to highways and median income all had a low inverse relation in both regression analyses. All of demographic percentages for the White,

Figure 6.1



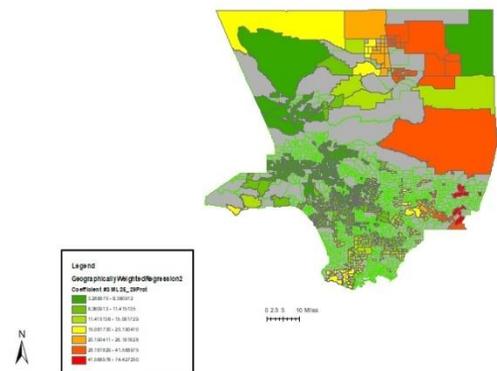
Coefficient of Males 18-21

Figure 6.2



Coefficient of Males 22-24

Figure 6.3



Coefficient of Males 25-29

Black, Asian and Latino populations had an inverse relation with the logged theft rate in the OLS and were eliminated from the GWR for high variance inflation factor or V.I.F. scores.

Based off of the GWR map the areas with the lowest *theft rate* given these variables were the Van Nuys, Foothill, Northeast, Wilshire and Olympic divisions of the L.A.P.D, and the areas with the highest theft rate were in the Rampart and Pacific divisions (see Appendix 1). Of the L.A.S.D jurisdiction, the lowest theft areas were the Lomita, Norwalk and Lakewood areas of the South Patrol Division, the Malibu/Lost Hills area of the North Patrol Division and the South Los Angeles and Marina Del Rey areas of the Central Patrol Division. The highest theft rates were scattered throughout the remainder of the South Patrol Division and the Santa Clarita Valley and Lancaster areas of the North Patrol Division (see Appendix 2).

The generate-near tool in ArcMap was also used to create a Manhattan-distance of where the thefts occurred in relation to auto-body shops and highways. Manhattan-distance accounts for streets and known highways, as opposed to Euclidean, which is a marker of straight line distance without obstruction. Generating a chart for the 2,376 incidents of theft would be extend this paper several more pages, but it is important to note that only 16 thefts farther than 4 miles from an auto body shop or major freeway, the farthest occurring in Lake Los Angeles. It is also important to note that although the Malibu/Agoura/Calabasas was eliminated, all the thefts occurred along the Pacific Coast Highway or the 101 Freeway, adding some credence to the hypotheses of highway access to the facilitation of motorcycle theft.

CHAPTER 5: DISCUSSION

Summary of Findings

Property theft is hard to predict, because it is both premediated and random; calculated larceny and spontaneous crime of opportunity. Motorcycles, despite their popularity, are still seen as a risky luxury, more difficult to finance, insure, and protect. By N.I.C.B. and local law enforcement reports, Los Angeles County is a precarious place to own and retain a motorcycle, but the factors facilitating theft were far from conclusive.

Distance to and from freeways and auto body shops were not a significant factor most likely because Los Angeles is primarily accessible only by freeway, and auto body shops need to be centrally located to freeways to garner business. Freeways are integral to transportation within the county, whether it is for legal or illegal purposes, but the presence of theft near them does not carry the same weight as it would in a county with less freeways. This same line of reasoning applies to potential ‘chop-shop’ auto body establishments. It may not be a significant factor because there is such a high amount of auto body shops and they are located in densely populated areas to facilitate business, not necessarily as primary fronts for auto and motorcycle theft.

Population density is usually, as stated earlier, a major variable in the prediction of crime. Although the kernel density maps do correlate with the denser areas of Los Angeles County, population density was not a significant variable within this study. In fact, it was consistently the lowest coefficient value in the OLS and GWR analysis, which was surprising. Generally speaking, the more people within an area, the more likely the amount of property and

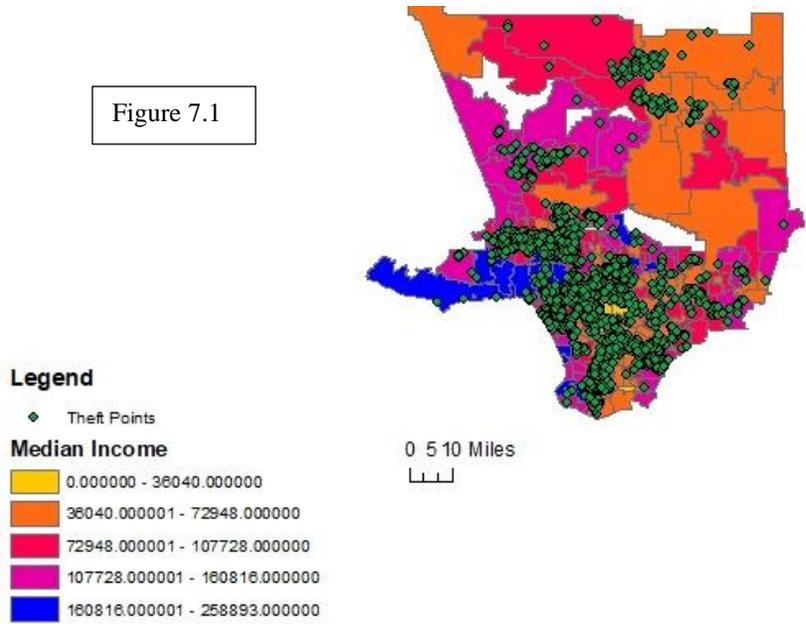
therefore, the opportunity for crime. A densely populated area like Los Angeles will most likely have more bikes available for theft than a rural area in the Midwest United States. Yet, because Los Angeles County is so heavily populated in most areas, population density and motorcycle ownership do not necessarily correlate, nor does motorcycle theft.

C.H.P stings and law enforcement task forces have shown that the motorcycle criminal enterprise spans race, ethnicity, state lines and even continents (Claims Journal, 2005) and have tracked stolen bikes in California primarily headed to the Port of Long Beach, into Arizona, Nevada and Mexico. Men from all backgrounds have been caught both facilitating and consuming as a part of the illicit world of motorcycle theft. However, the variables of race were not significant within this study, and all racial categories actually had an inverse relationship with motorcycle theft. The lowest negative coefficient value was among the Latino population, but according to the 2010 Census, Latinos comprise nearly 47% of the population of Los Angeles City, and California and Los Angeles County now has more Latinos than any other county or state (Panzar, 2015) and the largest group may also be the largest target. The highest motorcycle theft rates do coincide with heavy Latino populations in the San Fernando Valley, Compton and Southgate areas, but others areas such as Marina Del Rey and Inglewood with heavy Black or White populations tends to skew any racial generalizations about motorcycle theft. The high V.I.F scores regarding demographics may have high collinearity because Asian populations correlate heavily with White populations in the same pattern as Black and Latino populations.

Although income was not a significant factor in the OLS or GWR analysis, it is important to note that the most of the motorcycles stolen in Los Angeles County come from middle to upper-middle class neighborhoods. Figure 7.1 displays the theft points and the base map

indicates average median household income. The larger zip code polygons are an easily accessible graphic depiction to quickly represent the relationship between theft and income. However, because there may vastly different demographics and incomes within a zip code area, census tract data is

Figure 7.1



usually the default scope of most social geographic studies. Over the 2013-2015 period, 40 motorcycles were stolen in census tract 87 the Marina Del Rey area of Los Angeles County which has a median income of \$107,730 to \$161,000. Of the motorcycles stolen, most occurred in the median income areas of \$73,000 to \$107,730 per year, with very few of the thefts occurring at the low-income range or in wealthier areas as a whole. One may assume that is because high-end neighborhoods can afford greater degrees of protection, or may prove less likely to own motorcycles. Poorer areas may have plenty of motorcycles, but perhaps few worthy of stealing.

Areas that may appears to have a lower theft rate may not be any safer, only lower in actual motorcycle ownership. A suburban, affluent neighborhood may not have a high percentage of sport-bikes available, but the residents that do own them may be lulled into a false sense of security, where their bike stands out more to the potential thief than in a middle to low-

income area. Over the years in this study, the wealthy areas of Marina Del Rey and Playa Vista areas had a rash of motorcycle thefts. Motorcycle theft may be lower in higher income areas because the motorcycles that thieves crave are not readily available there. Generally, the wealthy areas are inhabited by older residents that most likely do not own motorcycles, and if they do, it is highly unlikely that it is a super sport Japanese import and they most likely keep it in a garage.

The one consistent factor that had high statistical values were young males, particularly in the 22-29 age bracket. However, as many criminologists have shown, young males are the primary facilitators of both property and violent crime. This is coincidentally the primary age demographic for street bike riders as well. Although young men may be the primary perpetrators of motorcycle theft, they may collaborate with or report to older men that may have started in criminal activity and no longer can continue, or own the physical capital of the 'chop-shops' and social connections to move stolen property. Younger men with disposable income in lower to middle-class income areas are most at risk because they are also the source of the demand. The variable of males aged 30 to 34 had a high coefficient value but also a higher V.I.F. value. This maybe be because males of this age bracket would be the most likely to live next to each other than males of other age brackets, because of homeownership, child rearing, job opportunities, etc. Since that age bracket is less likely to commit property crimes, but may have bikes stored at their homes, it may predict why this age group has a high coefficient value. Males of any race aged 30 to 34 in relation to theft would be highly predictive of each other and redundant, which may explain the higher V.I.F. value. What is difficult to explain is why the age bracket of males 18-21 had either an inverse relationship or low coefficient value consistently in association with motorcycle theft. It may be because 18-21-year-old males are living with parents, in high school

or college, and both unable to afford a motorcycle to steal or have a place to stash a motorcycle that they have stolen without fear of discovery.

Study Limitations and Future Research

While doing the preliminary research for this topic, as is the case with many studies of criminal behavior, limitations on the reliability and availability of the data are issues. As for motorcycle theft, the data available is often lumped category by police departments with boat and auto theft, and rarely are there specific details on what *kind* of motorcycle (e.g., cruiser, street, dirt) was taken or what *make* (e.g., Yamaha, Harley, Ducati) the motorcycle taken was. Some of this data is available through the N.I.C.B, or the National Insurance Crime Bureau, an agency that deals exclusively with vehicular property theft reported by law enforcement departments. Unfortunately, *specifically where* and *which law enforcement agency reported each incident* is data that is not readily available.

The N.I.C.B submits a report annually of both insured vehicle thefts and compiles the statistics by state, county and city. For example, in 2013, there were 6, 637 motorcycle thefts in California, 1,589 in Los Angeles County and 545 in the city of Los Angeles. Of the **makes** stolen, Honda as manufacturer led the way in the United States with 8,557 reported thefts of various types of motorcycles nationally. Suzuki was the frontrunner in **models** with the 2007 Suzuki GSX-R super-sport motorcycle registering 1, 012 reported thefts nationally. California led the country and Los Angeles County led the state in motorcycle thefts, but New York City had the highest count for citywide theft with 1,001 reported thefts in the year 2013. According to the NICB report, theft rises in the months of July and August and declines in the months of December and February. California led the way with the highest count of recovered motorcycles, at 2,399 reported (Jalowiecki, NICB Report, 2014). Although it is encouraging that nearly a third

of the motorcycles stolen were recovered, quite often the motorcycle is not intact or is significantly damaged upon recovery.

Conversely, the automobile theft rate in California has been dropping steadily (Fleming, 2017). Within the same year of 2013, the highest rates within the country were in the Central Valley, specifically the San Francisco Bay Area, Modesto, Bakersfield, and Stockton. Just as with motorcycles, California topped the NICB's list of auto thefts, with 176,745 thefts, 50,758 of them occurring within the Los Angeles City metropolitan area alone. While those numbers are staggering, taking into context that the state has 28 million registered operating vehicles at the time makes for a much less dismal outlook. The United States' auto theft had dropped 58% from 1991 when there were 1.7 million reported thefts, and grand theft auto was down 2.6% in Los Angeles (Hirsch, 2014).

Although the National Insurance Crime Bureau's thorough statistics are a prime data source, the data as it appears in the report cannot be used to make a spatial hypothesis. First, although the crime report is broken down to the city level, there is no frame of reference to exactly where the thefts took place, nor the recoveries for that matter. Of course, to make any sort of geographic hypothesis, geo-referencing is necessary.

Second, the only data that is available is the thefts that are *reported* to insurance companies or law enforcement agencies. Often referred to as the 'dark figure of crime' ((Hart & Lersch, 2011 pp. 16, 19) crime statistics are often not based on the true count of victimization, for a variety of reasons as eclectic as the crimes themselves. Many motorcyclists, despite purchasing their vehicles legally, are unlicensed and their vehicles may be unregistered or uninsured. The same anonymity provided to motorcycle thieves is available to motorcycle riders, and the added cost of registering or insuring a sport-bike used for pure recreation may not be

worth the costs of properly registering it with authorities. According to the National Highways Traffic Safety Association, one in four riders killed in a traffic collision were unlicensed in 2012 (NHTSA Report, 2012).

Third, riders often learn through informal settings from family or friends, and California only requires the Highway Patrol safety certification for operators under the age of 21. California allows operation of a motorcycle after completion of a restricted permit test for six months, although the permit can be renewed through a testing fee (California DMV). Riders may continue to operate without a full license for some time. Those same motorcyclists then continue to ride without insurance, because insurance companies *eventually* require a full motorcycle license endorsement. In 2012, Insurance Research Council estimated that there were 4.1 million uninsured drivers in California, based off the ratio of claims submitted by insured drivers involved in collisions with uninsured motorists (IRC Report, 2012). Although it has proven difficult to find, the ratio of uninsured motorcycle riders may be similar or much higher.

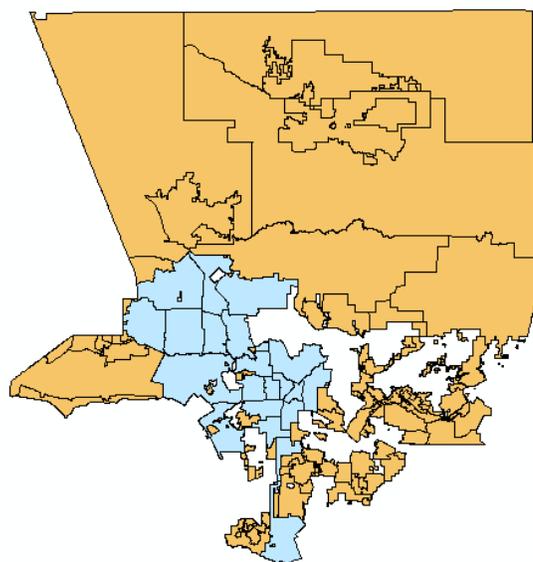
Last, when a motorcycle is stolen, there is very little that police can do if the bike is not equipped with a tracking device and there was no surveillance of the crime. Some victims may not report the crime because of the lack of confidence they have in the police to apprehend the criminal or recover their bike, (Hedayati, 2013) and in large metropolitan areas like Los Angeles, theft recovery is a low priority.

In addition to underreporting and under-insuring motorcycles and their thefts, data is sparse and not geographically available from smaller police agencies, many of whom have not the resources, time, or desire to process or volunteer the data. In the Los Angeles County area, the two largest law enforcement agencies are the L.A.P.D. and Los Angeles County Sheriff, or L.A.S.D. Elsewhere in the county, there are over forty-three separate agencies operating in

different cities with their own jurisdictions and databases. Although most of these smaller police departments do have crime data available, it is either static lists of the violent or property crime or very rudimentary crime maps that take time to geo-reference.

Some of the agencies only offer crime data from the previous two or three years, and formal requests are mandatory to release older theft reports. Although there has been a push in recent years for transparency in law enforcement reporting of crime, there is certain level of civilian obliviousness that law enforcement benefits from. Showing the amount of crime that occurs in each area not only heightens resident fear of victimization, but also fosters a lack of confidence in the local agency (Hart & Lersch, 2011). Sometimes, even with violent and property crimes, ignorance is bliss. Unlike the larger L.A.S.D and L.A.P.D, smaller municipal departments may not experience the amount of thefts reported, may not see the necessity for geo-referencing the reported thefts, and may feel pressured to underreport crime in certain areas to give the illusion of a safer community, as has been seen in numerous wealthy or ‘up-and-coming’ areas across the country (Hart & Lersch,

2011). Listed are the municipal and L.A.P.D departments that did not provide data for this study: *Municipal departments* - Arcadia, Alhambra, Azusa, Baldwin Park, Bell, Bell Gardens, Beverly Hills, Burbank, Claremont, Covina, Culver City, Downey, El Monte, El Segundo, Gardena, Glendale, Glendora, Hawthorne, Hermosa Beach, Huntington Park, Inglewood, Irwindale, La Verne, Long Beach,



L.A.P.D. divisions pictured in light blue, L.A.S.D divisions in tan, and divisions or departments missing data are omitted in white.

Manhattan Beach, Monrovia, Montebello, Monterey Park, Palos Verde Estates, Pasadena, Pomona, Redondo Beach, San Fernando, San Gabriel, San Marino, Santa Monica, Sierra Madre, Signal Hill, South Gate, South Pasadena, Torrance, Vernon, West Covina and Whittier.

L.A.P.D Divisions - Devonshire, Newton, Southeast (no N.I.C.B data available)

Policy Implications

There are several basic steps that law enforcement officials can take to help reduce motorcycle theft. Besides cracking down in problematic areas, setting surveillance on potential ‘chop-shops’ (Nichols, 2015) and possibly using ‘bait-bikes’ that have become popular in other states and countries, it may be advantageous to require motorcyclists and trailered bikes to pass through random mandatory checkpoints to verify VIN numbers, license plates and against outstanding police theft reports, especially during the summer months when theft is at its peak. Sharing data between law enforcement agencies from the city to the federal level is also imperative, as illustrated by departments across the nation (Lyons, Teigen, 2008). Although it may be a biased opinion, the most important thing that the law enforcement agencies can do is geo-reference the actual crimes. The geography of crime is imperative to its prevention, and giving agencies the tools to most effectively use their resources not only saves time, but also money.

It is important to note that during the course of this thesis, one of the motorcycles which was stolen from the author was recovered in Palmdale by Los Angeles County’s Taskforce for Regional Auto-theft Prevention team, or T.R.A.P. Established in 1993, T.R.A.P. incorporates several agencies along multiple jurisdictions work together with specific attorneys to capture and prosecute offenders and return stolen property to the rightful owners. Besides recovery, the

T.R.A.P. team also helps to educate the public on fraudulent advertisements, title scams and auction and used car dealership pitfalls. The particular offender in the recovered motorcycle from Palmdale will be serving a minimum sentence of two years in county jail for receiving stolen property. This joint law enforcement taskforce has made it very clear that it takes both automobile and motorcycle theft very seriously.

There will have to also be stringent application on the investigation of online sales of motorcycles in whole or part, on sites like Craigslist.com and eBay.com, and the technological and legal muscle to back such investigation. The sentiment which law enforcement and the public has towards motorcycles and their riders will also have to change. That would also mean that motorcycle riders' image and behaviors would have to change as well, which may be very hard to nearly impossible to achieve. Increased ridership has not meant diminished risk or theft, and subculture ties within the motorcycle community can also be used to enable larceny. A highly determined thief may be able to steal any bike, but the one factor that may be the most preventative is a vocal neighbor or suspicious shop owner willing to expose thieves for who they are.

Conclusions

It takes a certain mindset to operate a machine that is capable of accelerating from 0-100 miles per hour in under six seconds with no protection available except a helmet (still optional in some states) and the occasional protective jacket and pants. Combined with a youthful sense of invincibility, testosterone, or a cocktail of both, motorcycle culture was built to be rowdy and flirt with danger and skirt the law. However, to find a solution, there does need to be a perceived problem, and for motorcycle theft to be taken seriously, both ridership and motorcycle culture needs to be seen in a different light.

The hypotheses of this thesis explored that demographics, proximity to auto body shops and freeways, age groups, population density and median income were largely inconclusive in predicting motorcycle theft. Targeting a specific age group is not a feasible option for prevention, but more can be possibly done on raising awareness at motorcycle related events, dealerships, and training courses. Some insurance companies offer policy discounts for having security anti-theft devices on the motorcycle, but given the losses that they suffer each year and the ease of stealing unsecured bikes, this may have to become a mandatory practice. Unfortunately, if that security device is removable, there is no guarantee that the owner will use it consistently, nor is always the ultimate deterrent. There is a saying within the motorcycle community, “you can’t make it impossible to steal, just make it harder to steal than the next guy’s.”

It is refreshing to recognize the steps that law enforcement has been taking towards motorcycle theft as a specific problem, and continued interagency cooperation will be instrumental in mitigating and prosecuting thieves and recipients of stolen property. It would be advantageous for both riders and law enforcement to foster stronger community ties, both for the exchange of information and mutual trust. Officers may have more personal incentive and knowledge to catch a motorcycle thief if they are in possession of a bike they are familiar with, taken from a person that they know. Riders may feel more confident that the police are invested in finding their stolen property if they have an amicable relationship with the local authorities, and more forthcoming about information or suspicion on individuals or certain establishments. This could be accomplished by a positive task force presence at motorcycle related events, known motorcycle gathering spots, such as Glendale Mountain Road, Mulholland Road, and Los Angeles Crest Highway, and perhaps at law enforcement sponsored events in various areas.

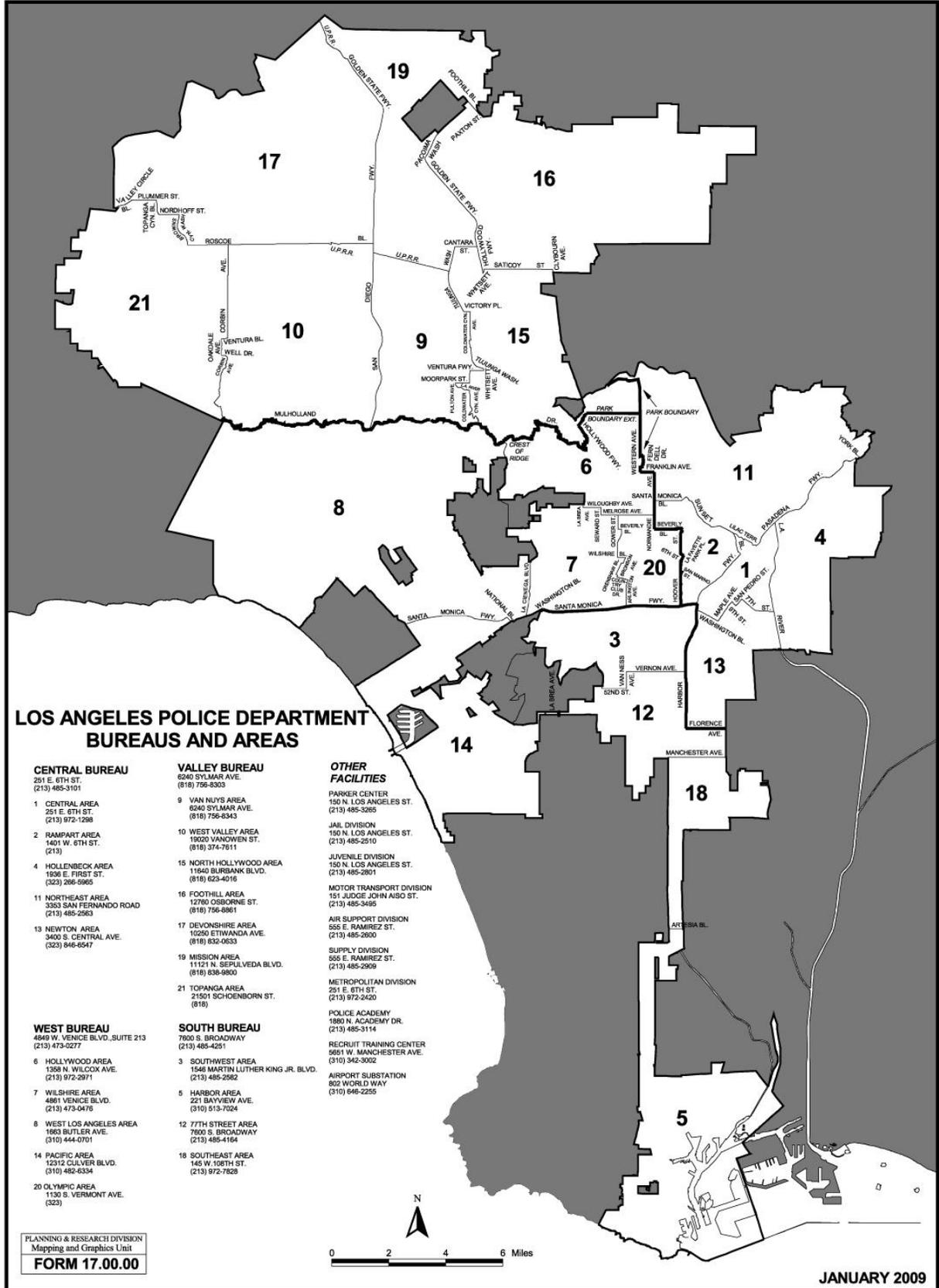
Last, there will have to be private investment in prevention with regards to motorcycle theft, which may be the most difficult aspect to change. Future research would have to be done on the subject, but apartment complexes and gated communities vary in the security measures that are in place to prevent theft, and it is standard practice to limit liability to the residents instead of the property management. Unlike cars, there may not be assigned and secured motorcycle parking within these facilities, making an unattended bike completely at the risk of the owner. Gates and keycards can be circumvented, but a solution may be to have bolted permanent locks on the property and assigned parking, as well as dedicated surveillance. This would also mean that these communities would have to specifically cater to motorcyclists, and given some of the general public's opinion on motorcycles and motorcycle riders, that is doubtful. As a community marketing strategy around areas with high levels of ridership, it may be a sound business practice.

As innovation and accessibility to new technologies arise, riders, law enforcement, insurance companies, and communities will have to evolve strategies to combat the ever-present danger of motorcycle theft in Los Angeles County and throughout the world. Southern California will be a destination for great riding into the foreseeable future, and hopefully it will also be a safe and secure place to own a motorcycle.

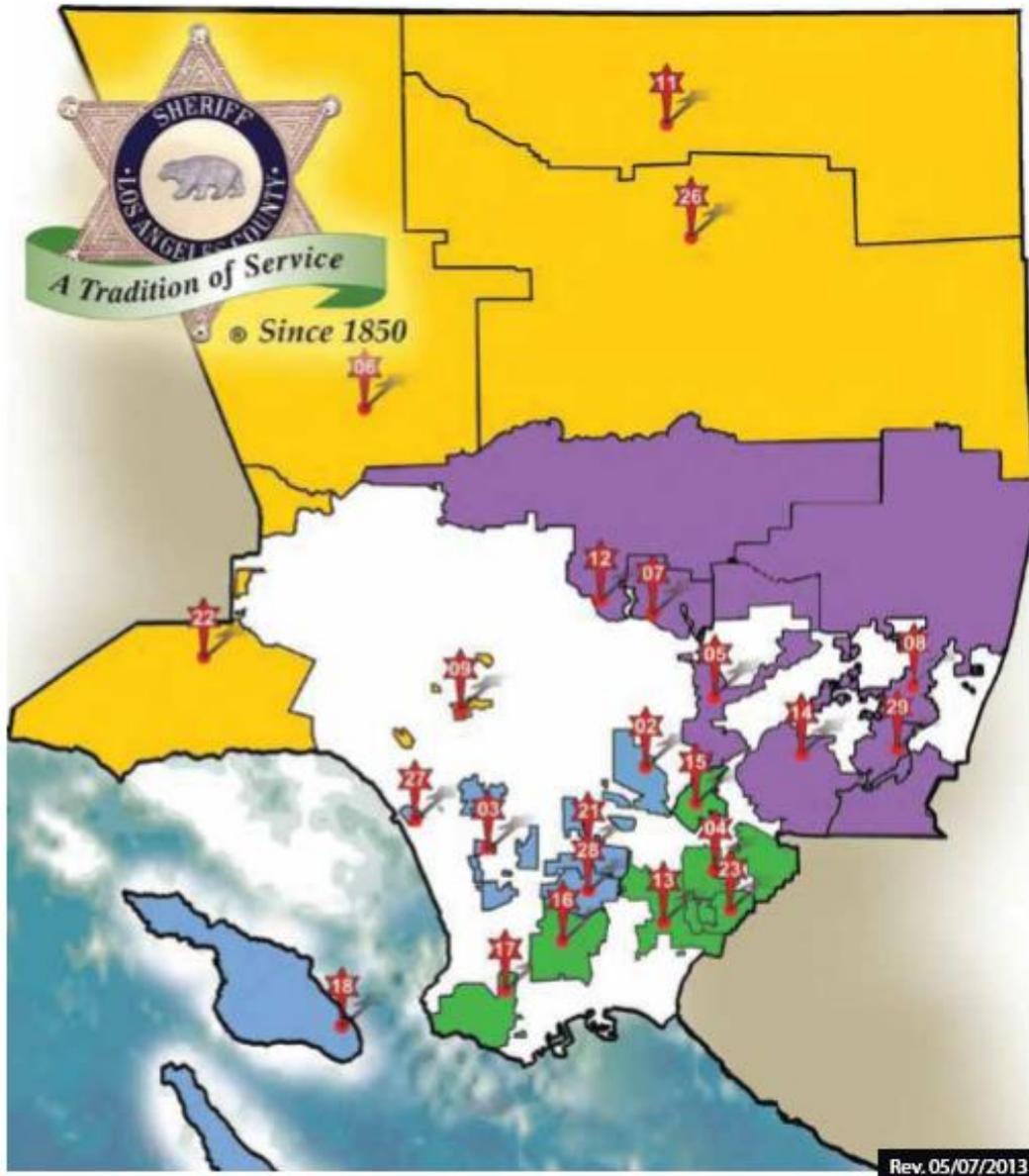
References

- 1) McIntosh, Phyllis. "On The Move," (2013) Vol. 51, no.3, pp.36-45
- 2) Brickell, David. Cole, Lee S. "Bike Theft: A Complete Guide to the Investigation of Motorcycle and Bike Theft," *National Criminal Justice Reference Service*, (1979) 27-32
- 3) Aamidor, Abe. "Shooting Star: The Rise and Fall of the British Motorcycle Industry," pp. 1-133. Toronto, Ontario, Canada: ECW Press, 2009
- 4) Fleming, Charles. "Motorcycle Thefts Rise Nationwide-again-and California is the Top State." *Los Angeles Times*, May 18, 2017. Retrieved from www.latimes.com, June 2016
- 5) Hart, Timothy.C., Lersch, Kim.M. "Space, Time, and Crime 4th Edition," pp. 16,19, 87-94, 288, 356-359 Durham, North Carolina: Carolina Academic Press, 2011
- 6) Hedayati, Heydeh. "Commercial and Farm Vehicle Theft in Rural Australia," *Southern Rural Sociological Association: Southern Rural Sociology*, (2008) pp. 54-77
- 7) Clarke, Roland.V., Weisburd, David. "Diffusion of Crime Control Benefits. Observations on the Reverse of Displacement," *School of Criminal Justice: Rutgers, The State University of New Jersey*, (1994) pp. 165-180
- 8) Field, Samuel. "Crime Prevention and the Costs of Auto Theft: An Economic Analysis," *Crime Prevention Studies: Criminal Justice Press*, (1993) pp. 12-45
- 9) Siler, Wes. "Ask a Motorcycle Thief." *A Ride Apart Magazine*, May 4, 2013
- 10) Lyons, Donna., Teigen, Anne. "Auto Theft Prevention," *National Conference of State Legislatures: Criminal Justice and Transportation*, (2008) pp. 6-16
- 11) Crundell, David., Bibby, Peter., Clarke, David., Ward, Patrick., Bartle, Craig. "Car Drivers' Attitudes towards Motorcyclists: A Survey," *Accident Research Unit, School of Psychology: University of Nottingham, Nottingham, United Kingdom*, (2007) Vol. 40, Issue 3, pp.983-993
- 12) Copes, Heith. "Street Life and the Rewards of Auto Theft," *Department of Justice Sciences: University of Birmingham, Birmingham, Alabama*, (2003) pp. 309-332
- 13) Rengert, George. F. "Auto Theft in Central Philadelphia," *Department of Criminal Justice: Temple University*, (1997) pp.203-216
- 14) Jalowiecki, P. "Motorcycle Theft and Recovery (through 6/30/2015) Report: Public Dissemination." *National Insurance Crime Bureau* (2014)
- 15) Hirsch, Jerry. "California Cities Lead Nation in per Capita Car Theft." *Los Angeles Times*, June 26, 2014. Retrieved from www.latimes.com, June, 2016
- 16) Traffic Safety Facts, Research Notes – 2012 Motor Vehicle Crashes: Overview. *U.S Department of Transportation: National Highway Traffic Safety Administration*
- 17) Corum David. "New Study Reveals a Declining Trend in the Percentage of Uninsured Motorists," *Insurance Research Council*, (2014) pp. 1-2
- 18) Nichols, G. "How a CHP Sting Operation Uncovered a Massive Network of Motorcycle Thieves." *Los Angeles Times*, March 18, 2015. Retrieved from www.latimes.com, July, 2016
- 19) "Multi-State Motorcycle Theft Ring Busted; 16 Charged with Stealing 81 Cycles." *Claims Journal*, January 11, 2005. *Courtesy of Queens District Attorney Office and New York Police Department
- 20) Scafidi, Frank. "2013-2015 Motorcycle L.A.P.D. Theft Report." *National Insurance Crime Bureau* (2016)
- 21) Panzar, Javier. "It's Official: Latinos now Outnumber Whites in California." *Los Angeles Times*, July 8, 2015. Retrieved from www.latimes.com, December, 2017

Appendix 1



Appendix 2



LASD Patrol Divisions

North Patrol Division	Central Patrol Division	South Patrol Division	East Patrol Division
<i>Stations*</i> 11 Lancaster 22 Malibu/Lost Hills 26 Palmdale 06 Santa Clarita Valley 09 West Hollywood	<i>Stations*</i> 18 Avalon 21 Century 28 Compton 02 East Los Angeles 27 Marina del Rey 03 South Los Angeles	<i>Stations*</i> 16 Carson 23 Cerritos 13 Lakewood 17 Lomita 04 Norwalk 15 Pico Rivera	<i>Stations*</i> 07 Altadena 12 Crescenta Valley 14 Industry 08 San Dimas 05 Temple 29 Walnut/Diamond Bar

Appendix 3

Variable	Coefficient	Probability	Robust_t	Robust_Pr[b]	VIF
White %	-2.013514	0.001632	-3.310286	0.000984	31.070996
Black %	-2.172633	0.001868	-3.199174	0.001440	20.900130
Asian %	-2.170857	0.000815	-3.522309	0.000463	15.025047
Hispanic %	-1.334503	0.000071	-4.274162	0.000025	17.501364
Pop. Density	0.000001	0.018910	1.913751	0.055690	1.167700
Med. Income	-0.000002	0.085712	-1.823215	0.068599	2.689264
Males 18-21	-4.398959	0.162099	-2.326547	0.020191	1.699059
Males 22-24	9.189709	0.236646	1.022116	0.306985	3.226059
Males 25-29	2.387602	0.665909	0.327730	0.743202	10.023224
Males 30-34	6.723657	0.196774	0.934353	0.350354	8.281174
Avg. Dist (Hwy)	-0.000008	0.751980	-0.290487	0.771518	1.574046
Avg. Dist (Auto)	-0.000026	0.267000	-1.034328	0.301245	1.249487
Multiple R-Squared	0.089705		Adjusted R	0.077806	

Appendix 4

Census Tract	Males 18-21	Males 22-24	Males 25-29	Auto Body Dist	Population Density	Highway Distance	Median HH Income	Local (R2)
Tract 18	2.266321	-34.3721	20.19041	-0.00004	0.000004	-0.000003	-0.000002	0.690979
Tract 913	-10.1051	98.35437	3.28887	-0.00017	0.000005	-0.000167	-0.000019	0.504235
Tract 19	8.51809	-71.1857	5.14120	-0.00010	0.000003	-0.000038	-0.000002	0.45511
Tract 924	-13.1241	38.57968	41.5889	0.000122	0.000005	-0.000142	-0.000014	0.432466
Tract 39	-18.1399	35.92355	35.48740	0.000071	0.000008	-0.000133	-0.000013	0.407957

Census Tract	Males 18-21	Males 22-24	Males 25-29	Auto Body Dist	Population Density	Highway Distance	Median HH Income	Local (R2)
Tract 471	1.068447	2.545562	6.812745	-0.00004	0.000007	-0.000048	-0.000001	0.034596
Tract 208	1.871902	2.411149	6.998398	-0.00003	0.000006	-0.000037	-0.000002	0.034584
Tract 213	1.298386	2.640536	7.033458	-0.00004	0.000005	-0.00004	-0.000001	0.034304
Tract 207	1.375378	2.789151	7.383792	-0.00003	0.000003	-0.000033	-0.000001	0.035271
Tract 470	1.179482	2.450077	6.726483	-0.00004	0.000009	-0.00005	-0.000001	0.034864