5-1-2022

Built Environment, Land Use, and Crime: A Las Vegas Study

Stacey Lynn Clouse

BUILT ENVIRONMENT, LAND USE, AND CRIME: A LAS VEGAS STUDY

By

Stacey Lynn Clouse

Bachelor of Arts- Criminology and Criminal Justice
University of Nevada, Las Vegas
2015

Master of Arts- Criminology and Criminal Justice
University of Nevada, Las Vegas
2018

A dissertation submitted in partial fulfillment
of the requirements for the

Doctor of Philosophy- Criminology and Criminal Justice

Department of Criminal Justice
Greenspun College of Urban Affairs
The Graduate College

University of Nevada, Las Vegas
May 2022

UNLV | GRADUATE COLLEGE

Dissertation Approval

The Graduate College
The University of Nevada, Las Vegas

May 5, 2022

This dissertation prepared by

Stacey Lynn Clouse

entitled

Built Environment, Land Use, and Crime: A Las Vegas Study

is approved in partial fulfillment of the requirements for the degree of

Doctor of Philosophy- Criminology and Criminal Justice
Department of Criminal Justice

Tamara Herold, Ph.D.
Examination Committee Chair

William Sousa, Ph.D.
Examination Committee Member

Seong Min Park, Ph.D.
Examination Committee Member

Robert Futrell, Ph.D.
Graduate College Faculty Representative

Kathryn Hausbeck Korgan, Ph.D.
Vice Provost for Graduate Education &
Dean of the Graduate College

ABSTRACT

This study examined land use and crime against persons and crime against property in Las Vegas, Nevada at varying spatial levels of analysis. Using crime data provided by the Las Vegas Metropolitan Police Department and the Clark County Assessor's office, results at the macro-level of analysis reveal that property crime rates concentrated on commercial, transportation, communication and utilities, and industrial land use, whereas violent crime concentrated at commercial, multi-residential, and civic, institutional, and recreational land use. Upon examining the subtypes of land use that generate or radiate more crime, property crime concentrated on transportation land use, class 1 resorts, and storage facilities. Violent crime was more concentrated on public use parks, restaurants and cocktail lounges, and multi-residential land use. At the micro level of analysis, commercial property experienced more property crime and low-rise apartments experienced more violent crime. A growth curve analysis revealed that land use classification at the micro level of analysis was not found to have a significant influence on crime at place over time. Finally, this study explored within group variation to determine if a small proportion of class 1 resorts and multi-residential land use (risky facilities) account for the majority of the crime in Las Vegas and confirmed the iron law of troublesome places. These findings indicate that "what happens in Vegas," is not unique to Las Vegas.

ACKNOWLEDGEMENTS

I would first like to start out by acknowledging my daughter, Savannah Clouse. My pursuit of happiness and college education was all for you. I wanted you to see that anything was possible and that we are only bound by the limits that we place on ourselves. The most rewarding part of my academic journey was watching the trajectory of your life change as I changed mine. Watching you grow into the incredible woman that you are today has been nothing short of inspiring and you make me the proudest mom in the world. I will always be grateful for your presence through this journey with me and for your sharp wit when I needed a laugh. For you, I will always strive to be the best role model you could ever ask for. I love you to the moon and back.

To my parents, your continued support and encouragement mean more to me than any words I could possibly muster up to put on this paper. You guys are the best and your sacrifices did not go unnoticed. Thank you for everything. Jenny, thank you for all of the late-night calls providing me with the support and laughter that I needed to see this through. Logan Kennedy, Shon Reed, Tereza Trejbalova, and Josh Donnelly I could not have done this without all of you. Your friendship makes me feel like the luckiest person in the world. Thank you all for being such amazing friends and colleagues. Carmen Osier and Roxanne Shenefield, you two were always there to pick me up when I fell and dusted me off before anyone knew anything different. Your lifelong friendship can never be replaced.

Dr. William Sousa, Dr. Seong Park, and Dr. Robert Futrell, thank you for believing in me and for your advisement, not just on this dissertation, but also throughout my academic career. Dr. Tamara Herold, thank you for taking me under your wing and molding me into the best

academic that I can be. You have provided me with countless opportunities and advisement that have advanced my career further than I ever could have imagined. Thank you for seeing something in me that I did not see in myself. I will forever be grateful.

If it were not for the Las Vegas Metropolitan Police Department (LVMPD) and the Clark County Assessor's Office, this dissertation would not have been possible. Thank you to all of the analysts at LVMPD who compiled this data for me. Thank you, also, to the Clark County Assessor's office for helping me troubleshoot issues with the software and preventing me from giving up. You may have single handedly saved this dissertation. For anyone I may have missed, please know that you are appreciated, and I am eternally grateful for everyone's encouragement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Land use shapes how we move within urban spaces by providing starting points, paths of travel, and destinations. It stands to reason that land use also shapes the patterns and concentrations of criminal activity. This study of crime concentrations at different aggregate levels—macro, meso, micro—of land use in Las Vegas, Nevada, replicates and extends Wuschke and Kinney's *Built environment, land use, and crime* (2018) research, which explores the local connections between land use and two crime categories—property crimes and crimes against persons—to understand crime concentrations in a large urban environment. Crimes have been found to concentrate at the macro, meso, and micro levels, relative to the structure and physical features of the urban environment. Exploring two aggregate crime concentrations at three spatial levels will provide a more nuanced understanding of the local connections between crime and land use.

Urban environments are complex landscapes of pathways, activity nodes, and edges that guide our routine activity patterns (Brantingham & Brantingham, 1995; Cohen & Felson, 1979). We travel pathways to get to our office building, the gym, shopping centers, entertainment districts, and our home. At some of these activity nodes, large groups of people converge in time and space, creating criminal opportunity for motivated offenders, which results in the clustering of crime. And at some of the edges, territoriality among groups creates conflict.

Because land use determines how and when a location is used, and by whom (Kinney et al., 2008), specific land use types can attract or generate more crime. Commercial land use has

been significantly and positively associated with crimes (Wo et al., 2020), particularly if bars are nearby (Roneck & Bell, 1981; Twinam, 2017). Residential land use has also been associated with crimes (Brantingham & Brantingham, 1975), particularly if schools are in proximity to neighborhoods (Kautt & Roneck, 2007; Roneck & Lobosco, 1983; Willits et al., 2013). Closer examination of crime concentrations further reveals that they occur at specific facilities (Eck et al., 2007).

Although the examination of land use and crime has been conducted in locations around the world, none of the studies have focused on Las Vegas, Nevada, until now. The most populous city in the state and the twenty-fifth most populous in the nation, Las Vegas operates twenty-four hours a day, has a highly transient population, and draws an average annual influx of 42 million tourists. Because of this unique complex of factors, we might expect to find different crime concentrations at different aggregate levels of land use compared with that discovered in the existing research. The results from this study will highlight the importance of locally based research and emphasize how the relationship between land use and crime varies according to both crime type and scale of analysis in Las Vegas, Nevada.

Overview of the Current Study

Chapter 2 presents two interrelated theoretical perspectives that drive research on land use and crime: routine activity theory (Cohen & Felson, 1979) and crime pattern theory (Brantingham & Brantingham, 1993)**.** Chapter 3 reviews the existing literature—beginning with broad land use types (residential, commercial, industrial) and associated criminal activity, followed by land use subtypes (e.g., apartments, condominiums, shopping centers, schools) and crime, followed by crime-at-place—to discuss the importance of micro geographic crime

concentrations, both spatially and temporally. Chapter three also presents this studies research questions. The first research question explores which top land use types and subtypes are associated with higher rates of property crimes and crimes against person in Las Vegas. The second research question investigates crime concentrations at specific addresses and if these high crime locations remain stable over a three-year timeframe. The third research question examines if a small proportion of a homogenous group of facilities account for the majority of crime at place; or, if some facilities are more "risky" than others.

Chapter 4 describes the methods used to conduct the current research to explore the local connections between land use and two crime categories: property crimes and crimes against persons. The Clark County's Assessor's Office and the Las Vegas Metropolitan Police Department provided the data for this study. Chapter 4 also provides a detailed description of the study site in Las Vegas, Nevada. This includes land use codes, categories, and definitions as well as the crime data collected from the Las Vegas Metropolitan Police Department (LVMPD).

Chapter 5 provides the analyses as well as brief explanations of the findings. Findings highlight specific land use that experience high frequencies and rates of both crimes against property and crimes against persons at the macro (broad land use categories), meso (within groups of land use categories), and the micro (specific addresses) level of analysis. Findings at the macro-level analysis demonstrate that crimes against property occur more often than crimes against persons and TCU, industrial, and commercial properties have a disproportional crime rate per lot, as do CIR and multi-residential properties. Findings at the meso-level analysis found that crimes are not evenly distributed within the subgroup categories. And findings at the micro-level analysis found that crime concentrates disproportionately at specific addresses,

depicted in a J-curve. A growth model analysis is also presented to explore changes in crime concentrations over a three-year timeframe.

Chapter 6 concludes this dissertation with a discussion of the findings, contribution to current literature, and policy implications. I end with an argument for the critical importance of studying local land use and crime patterns.

CHAPTER 2

LAND USE AND CRIME THEORY

Studies of land use and various associated crimes have been driven by several theoretical perspectives: rational choice, opportunity structures, neighborhood (dis)organization, and learning theories, to name a few. However, the two interrelated theoretical perspectives dominating most of that research are routine activity theory (Cohen & Felson, 1979) and crime pattern theory (Brantingham & Brantingham, 1993a).

Routine Activity Theory

Cohen and Felson's (1979) original version of routine activity theory holds that crime occurs when these three elements converge in time and space: (a) a motivated offender, (b) a suitable target, and (c) the absence of a capable guardian. Daily activities—going to work, the gym, school, a store—place motivated offenders in proximity to potential targets, providing the opportunity for crime. Grounded in a rational choice framework (Clarke, 1980), this theory holds that offenders, given the right opening to maximize reward with limited risk, will seize criminal opportunity. Studies that examine land use often focus, then, on how particular land uses affect the frequency and content of social interaction among people and how this social interaction places offenders and targets in proximity.

A motivated offender is one who has the propensity and ability to commit a crime when a suitable target is present without a capable guardian. A suitable target is either a person or an object perceived as valuable, easy to target, visible, and accessible (McLaughlin & Newburn, 2010). A capable guardian is one who can prevent the motivated offender from converging with the suitable target. For example, during a visit to a jewelry store, a potential offender notices a

security guard watching over a jewelry case. Because of the security guard's presence, the potential offender decides against stealing jewelry. Or, on a deserted street late at night, a potential offender spots two people walking together so he decides against robbing or assaulting them. In both cases, the absence of a capable guardian would predictably result in criminal action because the motivated offender would be able to converge in time and space with the suitable target.

The proximity of motivated offenders to potential targets in high crime locations has a direct effect on victimization. Proximity is the physical distance between the locations where crime targets reside and where large populations of offenders are found (Cohen et al, 1981; Meier & Miethe, 1993). People are more likely to be victimized when they frequently associate with—or frequently come in contact with—offenders lacking guardianship (Sampson & Lauritsen, 1990). For instance, living, working, or spending time high crime locations increases the likelihood of coming in contact with a motivated offender, absent a capable guardian, thereby increasing the risk of victimization (Meier & Miethe, 1993).

Cohen and Felson (1979) argue that the structure of daily life following WWII and continuing through the 1960s created more opportunities—from residential burglary to violent crime—for motivated offenders to exploit. During this time, electronic appliances and cars became more costly, hence more valuable, and men and women spent more time outside the household, shifting their routine activities.

Over the years, routine activity theory has expanded to include a handler (Felson, 1986) and a place manager (Eck, 1994). The handler concept stems from Hirschi's social control theory, which suggests that behavior can be informally controlled through families,

communities, and societal expectations because people fear what will happen to their relationships if they behave badly (McLaughlin & Newburn, 2010). A handler is a prosocial adult who can exert some sort of influence over an individual's behavior. Extending this element, an intimate handler is someone close enough to know the potential offender very well. For instance, during a family celebration at a bar, John Doe drinks one beer too many and starts to get belligerent with another patron. To prevent the situation from escalating, John's aunt, Jane, reminds her nephew that he could be arrested for fighting and privately asks the bartender to no longer serve him. Likewise, an afterschool caretaker or even a rule-abiding peer functions as an intimate handler by decreasing—through presence, direction, or dissuasion—the likelihood of a juvenile's getting into trouble when their parents are not home.

A place manager is one who monitors and controls behavior at a specific place (Madensen & Eck, 2012), whether the owner or a representative of the owner with some level of responsibility, who can either mitigate or inadvertently facilitate crime (Felson, 1995; Madensen & Eck, 2012). Different from a capable guardian, a place manager does not protect a target but rather a place where suitable targets and motivated offenders converge. For example, an onsite apartment manager acts as a place manager when they keep an apartment complex relatively crime-free by running appropriate background checks on new potential residents while enforcing property management policy. Figure 1.1 depicts the relationship of factors necessary for the facilitation and mitigation of a crime per the original and extended routine activity theory:

Figure 1.1 Crime Triangle

(Eck, 2003)

Routine activity theory has guided research on exposure to motivated offenders, target attractiveness, and guardianship, including proximity of targets and potential offenders (Meier & Miethe, 1993), accessibility and visibility of targets in risky environments (Cohen et al., 1981), and target attractiveness in terms of instrumental value (larceny, robbery, and burglary) and expressive value (physical assault) (Miethe et al., 1987).

While defining routine activity theory has not been without issue, its predictive validity has varying degrees of support when the theoretical constructs are applied to multi-, macro-, and individual-level research (Madero-Hernandez & Fisher, 2012). Multilevel studies that incorporate individual-level variables (e.g., drug and alcohol use, gang membership, and overall delinquent lifestyles) when assessing victimization and social disorganization indicators in the neighborhood context demonstrate support for routine activity theory (Kennedy & Forde, 1990; Miethe & McDowall, 1993; Sampson & Wooldredge, 1987; Wilcox et al., 1994; Wilcox et al.,

2007). However, because aggregate-level data poorly capture and often conceal the spatial dynamics of situational crime (Eck, 1994; Madero-Hernandez & Fisher, 2012), macro studies that examine changes in social structures and rates of crime at neighborhood and census-tract levels (Bernasco & Luykx, 2003; Carroll & Jackson, 1983; Rice & Smith, 2002; Miethe et al., 1991; Roneck & Maier, 1991; Smith et al., 2000) demonstrate mixed results in support of routine activity theory. Individual-level studies on property victimization (Cohen et al., 1981; Miethe et al., 1987; Miethe & Meier, 1990; Mustaine & Tewksbury, 1989), violent victimization (Lasley, 1989; Miethe et al., 1987), and delinquency and criminal offending (Anderson & Hughes, 2009; Osgood et al., 1996) demonstrate strong support for routine activity theory because they are more likely to capture the spatio-temporal dynamics of routine activities (Groff, 2008).

Crime Pattern Theory

The convergence of a motivated offender and a suitable target through movement patterns in the built environment is explained by crime pattern theory (Brantingham & Brantingham, 1993). This theory has four main assumptions: (a) crime events are complex, (b) crime is not random, (c) offenders and victims are not pathological in their use of time and space, and (d) criminal opportunities and criminal events are structured (Brantingham & Brantingham, 2013). According to crime pattern theory, particular elements must come together for a crime to occur; and when crime does occur, it concentrates. Additionally, offenders and victims have normal perceptions of their environment, just as non-offenders do; and they travel in the same spaces as non-offenders and use places normally. Through normal

daily routine activities within the physical environment, a potential offenders' perceptions are shaped to identify criminal opportunity.

Crime is strongly related to features of our physical environment. Urban populations move in predictable patterns because designated and available travel routes, or pathways—that is, streets, roads, highways, transit lines, sidewalks, park paths—shape our routine activities (Brantingham & Brantingham, 1995), locating them where people either congregate or cross paths on their way to frequently visited places (Song et al., 2017). These high activity nodes, places central to our individual lives (e.g., homes, shopping centers, office spaces, gyms, bars, entertainment districts, sports stadiums), are thus concentrated sites for crime, attracting or generating it (Brantingham & Brantingham, 1995).

Crime attractors are those places known to offenders as "good" spots to commit specific crimes (Wuschke & Kinney, 2018)—bar districts, prostitution tracts, drug markets, and large parking lots near businesses, or specific street segments, specific businesses, and specific parks (Brantingham & Brantingham, 1995). For instance, an offender might decide to go drink at a specific bar because he knows the crowd is rowdy and he can easily get into a fight there; or an offender might hang out at a specific park because he knows he can control a nearby open-air drug market. A motivated offender will intentionally travel from one location to a crime attractor to exploit the criminal opportunity.

Crime generators are those places that draw large numbers of people for reasons unrelated to an offender's criminal motivation or the crime they might commit—generally shopping and entertainment areas (Brantingham & Brantingham, 1995). For instance, a potential offender might go to a crowded shopping mall for new clothes but find ample

opportunity for muggings or shoplifting. An offender might also find criminal opportunity in a stadium full of rowdy football fans, who, due to alcohol consumption and team allegiance, are more inclined to brawl and are less alert of their surroundings.

The pathways between nodal points are settings conducive to crime, as well—and specific offenses at that, namely property crimes: vehicle theft, burglary, and theft from vehicles, in particular (Brantingham & Brantingham, 2013). Offenders tend to commit a criminal act close to pathways—main roads anywhere or travel routes in their home area that become familiar through their routine activities.

Research suggests that criminal events also concentrate where two or more land uses converge—that is, where they form an edge, a change from one type of urban space to another (e.g., residential to commercial)—because people have a decreased ability to identify who belongs and who does not (Brantingham & Brantingham, 1995). Edges can thus mark areas of territorial conflict between groups (Brantingham & Brantingham, 1993b, 2013; Reynald et al., 2008; Clare et al., 2009). Edges represent an area in transition from one use to another (Song et al., 2017) such as (but not limited to) distinct land bordering a river, houses behind a commercial strip mall, a major roadway or railroad track.

Crime pattern theory has been used to guide research on factors that structure criminal opportunities and events, ranging from events shaped by routine activities (Brantingham & Brantingham, 1981b; Cohen & Felson, 1979), to time and distance of criminal opportunities (Brantingham & Brantingham, 1981a; Wiles & Costello, 2000). Crime pattern theory argues that crimes, the decision to commit crimes, and the process of committing crimes are patterned (Brantingham et al., 2017).

Offenders, like all people, have daily routine activities and movement patterns through which they become familiar with and comfortable in their environment. This familiarity of place is referred to as an "environmental backcloth" (Brantingham & Brantingham, 1993), a cognitive landscape of the built environment by which an offender recognizes criminal opportunities and can easily identify targets. This theory explains why crime concentrates in specific areas and why targets might draw the attention of offenders through patterned, routine activities.

Routine activity theory and crime pattern theory are interrelated but offer different explanations as to why crime occurs at specific locations. To explain crime at macro and micro-levels, routine activity theorists focus on discouraging crime by handlers who supervise motivated offenders, protecting suitable targets with capable guardians, and the use of place managers to monitor the environment where offenders and potential victims converge (Chamard, 2010). Crime pattern theorists focus on how offenders identify and gain access to places to commit criminal acts. Taken together, these two theories help explain that specific types of land use and facilities are associated with crime due to the routine activities associated with them and the types of people they attract. The next chapter provides a literature review of research that incorporates both theories to explain different aggregate levels of land use and crime.

CHAPTER 3

LITERATURE REVIEW

The subject of land use and criminal opportunity within the built environment has captured the attention of scholars for decades. Early thoughts on this phenomenon date as far back as the 1820s, when maps were first produced to display statistical information about crime rates across regions (Guerry & Balbi, 1829). The early studies examined crime at the macro-level, not only across regions, but also across cities and neighborhoods. Later, in the first half of the twentieth century, Chicago School scholars drew attention to land use patterns and crime concentration in a more localized area (Burgess, 1928; Park & Burgess, 2019; Shaw & McKay, 1942). High crime concentrations emerged within city centers and industrial areas, while single-family homes and suburban areas experienced fewer crime (Burgess, 1928). These findings led to a shift in scholarly focus, from an aggregate to a micro unit of analysis of place-based crime.

Land Use and Crime

Specific land use, movement about the environment, and designated activities at places shape the distribution of crime (Brantingham & Brantingham, 1995). Land use categories determine the types of facilities zoned for a location, which affects the frequency and content of social interaction among people, that is, when and how people converge in space and time (Corcoran et al., 2017; Stucky & Ostermann, 2009).

Commercial land use is more often associated with higher crime concentrations than residential land use (Smith et al., 2000; Wuschke & Kinney, 2018). Regarding the relationship between commercial and residential density and violent crime, Browning et al. (2010) found,

using crime data, census data, and parcel data from Columbus, Ohio, that increased commercial and residential land use was positively associated with violent crime, while lower rates of mixed commercial and residential land use led to decreases in homicide and aggravated assault.

Stuckey and Ostermann (2009) found, using data from the Indianapolis Metropolitan Police Department and the census, an association between higher violent crime counts and commercial and high-density residential land use, while lower violence crime counts were found at cemeteries and industrial properties. Their study is still one of the few that focused on several different types of land use and crime, though I should note that it included an examination of social disorganization theory, which uses socio-structural characteristics (chronic poverty, residential mobility, and ethnic heterogeneity) of neighborhoods and communities to explain crime. The theory is often used to emphasize that these socio-structural characteristics shape the behavior of people; in the current study, however, I am restricting my focus to the built environment and how the characteristics of place present opportunity structures for criminal activity.

Different types of facilities also generate varying levels of crime. A facility is a place or structure that serves a particular purpose (Eck & Weisburd, 1990)—public housing (shelter), a school (education), a gym (health), a convenience store (food and goods), a bar (leisure). That purpose, the facility's size and functions, and the size and makeup of the group served determine when and how crime concentrates in a specific place.

Larger facilities—public housing, schools, gyms, malls—bring larger groups of motivated offenders and suitable targets together through daily routine activities. McNulty and Holloway (2000) found that high-density government housing spatially anchors chronic poverty and crime

and that its location in already poor, disadvantaged neighborhoods contributes to further disadvantage and increased violent crime via a "spillover" effect. However, Haberman et al.'s (2013) research on public housing found that this is not always the case, that some communities have lower robbery rates than their surrounding neighborhoods, suggesting that some public housing design may allow for greater guardianship because of the high concentration of residential units. Despite omitting physical design from their study, McNulty, and Holloway (2000) do mention that it may play a role in crime. These divergent findings warrant further research on physical design and guardianship, as some design features may produce different levels of guardianship, regardless of neighborhood characteristics.

As for residential facilities, in Accordino and Johnson's (2000) survey of the most populated two hundred cities in the United States, they found that abandoned buildings were the most problematic type of vacant property for most cities because of increased criminal opportunity in the absence of capable guardianship (Cohen & Felson, 1978). Spellman's (1993) research on abandoned apartments and houses in Austin, Texas, found that 83% of them displayed evidence of illegal use by multiple types of offenders, and crime rates were twice as high in blocks with abandoned buildings.

Studies on schools suggest an association with higher neighborhood crime rates, specifically burglary (Kautt & Roncek, 2007; LaGrange & Silverman, 1999; Roncek & LoBosco, 1983), because crime in and around schools has a spillover effect that influences crime beyond the school environment (Willits et al., 2013). In an examination of the relationship between primary and secondary schools and neighborhood burglary rates, Kautt and Roncek (2007) found that the presence of an elementary school is significantly associated with higher burglary

rates on nearby residential blocks, whereas Willits et al. (2013) reported no pattern of crime near elementary schools, but found that blocks with high schools were 45% more likely to report aggravated assaults, and blocks with middle schools were more likely to report 25% aggravated assaults. Blocks with high schools also reported a 117% increase in larcenies. These mixed findings may indicate a lack of, or different levels of, guardianship. In places where burglary rates are high, houses may be left unattended, and schools may not be offering after-school safe-key programs that allow for the direct monitoring of juveniles. Because crimes at schools are often publicized by the media and politicians, schools themselves have been branded as crime facilitators (Kautt & Roncek, 2007).

Malls serve multiple functions at once—shopping, dining, and entertainment—regularly placing large, diverse groups of offenders and targets in close proximity to each other (Ceccato et al., 2018; Groff, 2011; LaGrange & Silverman, 1999). While small businesses attract smaller groups of people than larger facilities, in Fisher and Looye's (2000) survey of four hundred small businesses (manufacturing, wholesale trade, service, and retail) in six states, they found that crimes within and against businesses were common, and that some businesses were more at risk of specific types of crime than others. In particular, burglary, vandalism, and theft were the most common crimes committed against a small business; retail was more likely to experience at least one crime; manufacturing businesses experienced the highest frequency of acts of vandalism, and these crimes did not appear to be random.

Fast food restaurants and convenience stores that experience high sales volumes have also been linked to high crime, such as robbery (Askey et al., 2017). These busy activity nodes draw a heavy influx of people—offenders and targets alike—that creates high sales volumes

and provides an opportunity for motivated offenders to engage in criminal activity, particularly if the perception of risk is low and if offenders congregate outside. Hipp et al. (2017) also found that retail land use contributes to increased rates of robbery.

The commercial facilities that receive the most attention when it comes to crime are those that serve alcohol. Bars range in size and function (e.g., drinking, dining, dancing), but they all serve the purpose of leisure, bringing together diverse personalities with all manner of cultural differences, most consuming alcohol, creating the potential for arguments that may transpire to violence. Some bars draw specific people because of known criminal opportunity, fueling violence in and around the physical location (Franquez et al., 2013; Madensen & Eck, 2008; Ratcliffe, 2012; Roneck & Bell, 1981; Roneck & Maier, 2008; Spicer et al., 2012). For instance, Roneck and Bell's (1981) research on bars in Cleveland, Ohio, found that blocks with bars have significantly more crimes (for all crimes except rape) than blocks without. Replicating that study (1981), Roneck and Maier examined seven index crimes and all violent crime over a one-year period and found that, across all residential blocks, the number of bars on a residential block have a statistically significant effect for each crime type analyzed. Ratcliffe's (2012) study on bars in Philadelphia found that crime is highly concentrated around bar establishments themselves, and Sherman et al. (1989) found that liquor outlets are closely associated with high concentrations, or "hot spots" of crime.

Parks and playgrounds have also been associated with crime and branded as activity generators (Groff & McCord, 2012; Wilcox et al., 2004). Parks bring people together for the purpose of leisure: families picnic together, kids play on playgrounds, and dogs run and chase frisbees. Homeless encampments, drug markets, and gang members can take over these spaces

(Groff & McCord, 2012), and some findings suggest an association between parks and an increased risk of burglary in surrounding areas (Wilcox et al., 2004). In line with crime pattern theory, parks have edges—an identified difference in characteristics from the surrounding environment—which experience high crime rates, in part because they mark areas of potential conflict where strangers may not be easily accepted or go unnoticed (Brantingham & Brantingham, 1975, 1978b).

Crime Places

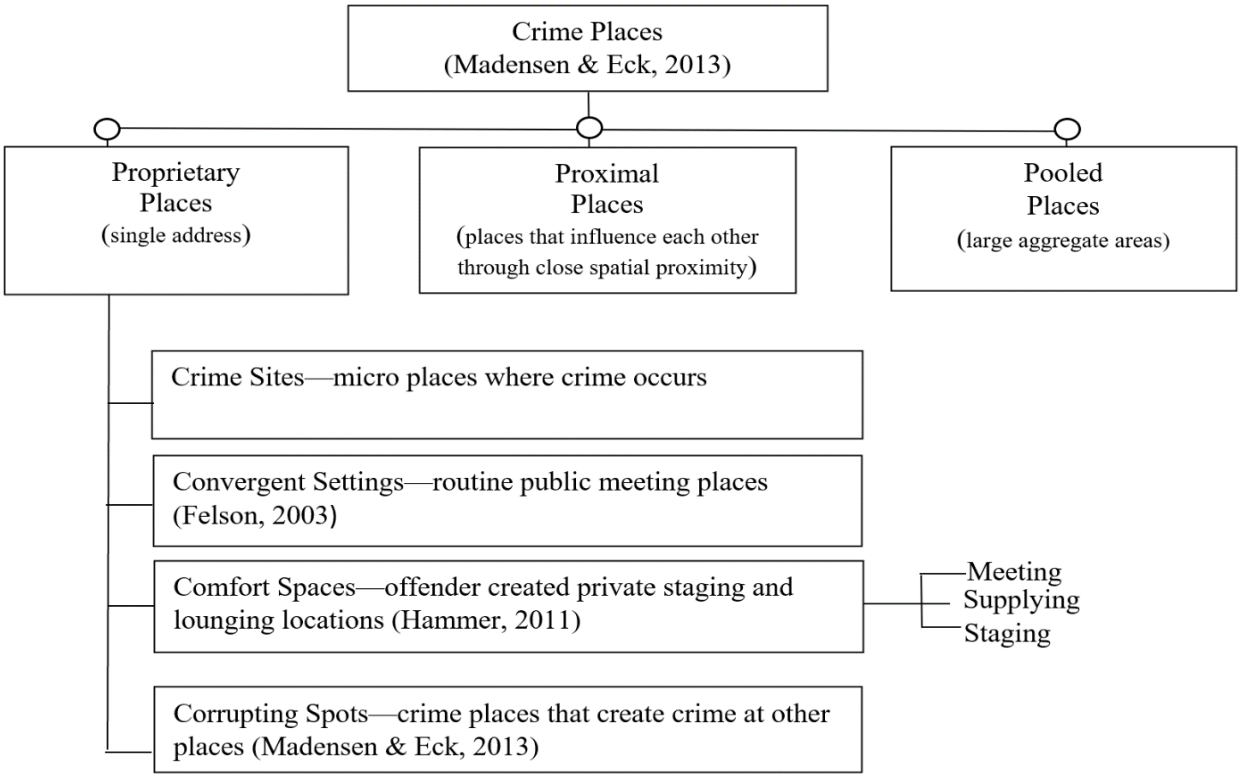
Before discussing crime places, it is important to define the concept of place. Over the years, scholars have used the term to refer to neighborhoods, census tracts, blocks, street segments, and addresses. But place is a portion of space, separate and distinct from space. In other words, place is a fixed physical environment (Sherman et al., 1989).

Places have been identified by the following aspects of their nature and size: pooled places, proximal places, and proprietary places (Madensen & Eck, 2013). Pooled places represent larger socio-physical units, including neighborhoods, subdivisions, and census blocks. Their boundaries are arbitrary and often fail to yield meaningful measurements of crime concentrations in regard to place. Proximal places are sets of proprietary places close enough in space to influence each other; they are located along streets and possess multiple owners. While these locations are clearly defined and easily measurable, they often fail to identify problematic proprietary places. Conversely, proprietary places are micro units found within proximal places. These are specific addresses, buildings, and land parcels with distinct owners, who have legal authority over their location's function and impact crime through place management. Proprietary places have distinct features: location, boundaries, function, control,

and size (Eck, 1994). While popular images of a place involve a fixed location (e.g., house or store), some places are mobile (e.g., buses, food trucks) (Eck, 1994). Most are micro-locations (single addresses), but proprietary places can include stadiums and concert venues and are rarely larger than a street block (Eck, 1994; Madensen, 2007).

Four types of proprietary places facilitate crime at place (see Figure 3.1). First is the crime site, that is, where the crime occurs, easily depicted on a map. Second is the convergent setting, a public place where offenders congregate or where criminals come together in space and time (Felson, 2003). These locations are used for a wide variety of purposes, including recruiting gang members or observation of nearby open-air drug markets. Third is the comfort space, a private location controlled by offenders, typically hidden from the police, where offenders stage for crimes and hide items to carry out said crimes (Hammer, 2011). These locations may hold drugs or stolen property or provide a place to "just hang out" (Hammer, 2011). Fourth is the corrupting spot, typically a business of some sort, also hidden from the police, that fosters crime at another location, such as a metal recycling plant that encourages copper theft for monetary compensation (Madensen & Eck, 2013).

Figure 3.1 Diagram of Crime Places



(Herold, 2018)

Research on crime places focus on the micro-location within the urban environment to address specific places and the characteristics that promote or draw high concentrations of criminal activity, or hot spots (Sherman et al., 1998). These areas have been defined at varying levels: blocks (Weisburd & Green, 1994), clusters of blocks (Block & Block, 1995), and addresses (Eck & Weisburd, 1995). While there is no common definition, Eck et al. (2005, p. 2) define a hot spot as "an area that has a greater than average number of criminal or disorder events, or an area where people have a higher-than-average risk of victimization." In other words, hot spots are places that receive a substantial concentration of police calls for service. Sherman et al.'s

(1989) research on crime and place found that 3% of places produced 50% of calls for service and that predatory crime, such as robberies, rapes, and auto theft, clustered at approximately 2% of places. Similarly, Weisburd et al. (2004) discovered that 4% to 5% of street segments produce 50% of crime. Their findings demonstrate significant crime clustering at place, reaffirming that crime is not random (Weisburd et al., 1992, 2004, 2012, 2014).

While current research explains that specific places are more criminogenic than others (Weisburd et al., 1992, 2012, 2014; Sherman et al., 1989; Braga et al., 2010; Andresen & Malleson, 2011; Curman et al., 2015; Hibdon et al., 2017), crime also concentrates in the same location over time (Andresen, Curman, & Linning, 2017; Andresen, Linning, & Malleson, 2017). Research from Vancouver, Canada, in particular, demonstrated that, despite a crime drop, spatial stability remained over time (Andresen et al., 2017), confirming the law of crime concentration (Weisburd et al., 2012).

Risky Facilities

Crime concentrates (Sherman et al., 1989; Weisburd, 2004, 2012). Otherwise known as the 80/20 rule, a small proportion of proprietary places will produce the most crime (Clarke & Eck, 2005; Eck et al., 2007). Meaning, a small percentage of places will produce the most calls for police service.

Empirical evidence demonstrates that crime concentrates within specific land use subtypes. However, a small proportion of proprietary places experience the most crime (Brantingham et al., 1976; Eck, 2007; Madensen & Eck, 2013). As previously discussed, when examining crime at the micro-scale (addresses) specific high crime places emerge. These high crime places are “risky facilities” (Eck et al., 2007). Risky facilities are sets of homogenous places

where crime clusters. More specifically, they are “a small proportion of the group of crime places that account for the majority of crime experienced by the entire group” (Eck et al., 2007, p. 226). This concentration of crime is represented as a J-curve (see Figure 3.2).

When Eck et al. (2007) examined varieties of crime concentrations at facilities they found that crime is not evenly distributed. In Kansas, 20% of the bars account for 62% of the calls for police services. In Connecticut, approximately 20% of stores contribute to 85% of the shoplifting reports. In Florida, 20% of apartment complexes contribute to 47% of the crime. After examining facilities more specifically, they found that 19% of motels contribute to about 51% of the calls for service. This concentration, or J-curve, appeared even after separating these motels into locally owned and national chain categories, with each within-group category demonstrating their own specific concentrations. Because this phenomenon is so common, it has been designated the “iron law of troublesome places” (Wilcox & Eck, 2011). Meaning that a few facilities at the left end of the distribution will experience many crimes. If a J-curve distribution is not found in the current study examining facilities in Las Vegas, it will be the first exception to this rule.

Figure 3.2 J-Curve of Crime Concentration at Facilities

(Eck et al., 2007)

Eck et al. (2007) states that risky facilities show up as hot spots on a crime map but treating them as such could create a missed opportunity for revealing significant differences between other members of the set of facilities. Knowing that risky facilities are hot spots themselves allows for police and community resources to focus on prevention measures in a specific location (Madensen & Eck, 2013). If a specific place within a group of facilities receives more calls for service than others, place management practices may be at the center of the problem. The place management concept, discussed in chapter 2, explains that assigned individuals are responsible for controlling behavior at a specific place (Madensen & Eck, 2013).

In line with Eck's (1994) contribution to routine activity theory, motivated offenders capitalize on criminal opportunity when places are unprotected by managers, particularly if the

place is known to have suitable targets. Offenders make choices about places based on environmental cues developed through their routine activities. As such, some facilities may draw more crime based on specific characteristics such as the lack of capable guardianship and improper place management.

Understanding the impact of diverse types of land use and crime holds important implications for shaping policy on urban planning/regeneration, crime prevention measures, and policing. Some findings suggest that communities that suffer from depopulation and deurbanization can experience initial increases in violence during revitalization periods (Browning et al., 2010). This is because when revitalization efforts occur, streets and places become more active with people, bringing with it greater chances of criminal activity. However, Browning et al. (2010) found that commercial development and an increase in residential properties can lead to greater guardianship, eventually decreasing violent crime. Other findings suggest that high density housing produces more violent crime and produces a negative impact in disadvantaged areas (Stucky & Osterman, 2009). Yet, industrial land use may serves as a buffer against this violence.

While the impact of crime on diverse types of businesses suggest that the risks are not evenly distributed (Eck, 2007; Fisher & Looye, 2000), being able to differentiate risky facilities from broad hot spots can lead to focused crime prevention measures and greater community partnerships with the police. A downturn in crime in some locations has already been attributed to a greater police presence (Lum et al., 2011); Sherman, 1990; Stucky & Osterman, 2009), but because we know that crime is both rare and not distributed evenly (Sherman et al., 1989), police can focus their resources on risky facilities.

Review of the Original Study

Wuschke and Kinney's (2018) study emphasized that the relationship between land use and crime varies according to both crime type and scale of analysis. Their study used crime data provided by a municipal detachment of the Royal Canadian Mounted Police in Coquitlam, Vancouver, Canada, classified as property crimes (*n*= 5,363) and crimes against persons (*n*= 989) for 2008, geocoded to the address recorded as the event location. A property crime occurs "when a victim's property is stolen or destroyed without the use of or threat of force against a victim" (nij.ojp.gov). Crimes against a person are crimes committed by applying direct physical harm or force to another individual.

The city of Coquitlam provided the land use data, divided into seven broad land use categories: residential; farm; commercial; stratified operational facilities area (SOFA: stratified housing complexes); industrial; transportation, and utility (TCU); and civic, institutional, and recreational (CIR: variety of land use types including parks, government buildings, schools, and hospitals). Each unit was then classified into detailed subcategories within the broader land use categories. Because of inconsistent recording practices for otherwise similar land use types (e.g., shopping complexes with multiple owners versus one owner, condominiums with multiple records, and apartments with one record per complex), all data were merged to one record according to address and land use category to maintain consistency when comparing similar property types.

The land use dataset was spatially joined by address to the crime dataset. Since the focus of the study is to explore the relationship between specific land uses and crime, events

that could not be directly linked to properties were removed from the study (Wuschke & Kinney, 2018).

Their study examined crime counts, crime rates, and land use at multiple levels of aggregation. Because Wuschke and Kinney's (2018) study location is predominantly residential, it is no surprise that a greater frequency of property crime fell in this land use category at the macro-level of analysis (followed by commercial, then CIR). However, only 55% of property crimes occurred on residential lots. Crimes against persons events followed trends similar to the property crimes. All crimes against persons occurred on residential land use, commercial land use, and CIR land use. In line with theory, crimes were not evenly distributed across the three different land use categories.

The top five land use subtypes with the highest rates of crime events per lot were identified in the meso-level within group analysis (see Tables 3.1-3.3). These within group subclassifications represent actual use of land for each property. While the macro-level analysis demonstrated that commercial properties experienced the most crime, the meso-level analysis of within groups revealed that residential land use experienced greater crime rates. Wuschke and Kinney (2018) also found that, in line with Weisburd et al. (2012), 26% of all property crimes concentrated at 1% of residential addresses, and 21% of all crimes against persons occurred on fewer than half of 1% of residential lots.

Commercial properties also exhibited high rates of crime. Both crimes against property and crimes against persons were found to concentrate at regional shopping centers (Wuschke & Kinney, 2018). They report that 34% of all property crimes and 27% of all crimes against persons on commercial lots concentrated at five shopping complexes. In line with Weisburd et

al. (2012), 44% of property crimes and crimes against person were found in only 2% of total commercial lots.

Similar crime concentrations were revealed for CIR land use. While local hospitals, recreational centers, and schools emerged as having higher property crime rates, hospitals and schools emerged as having higher rates of crimes against persons. Once more in line with Weisburd et al. (2012), Wuschke and Kinney (2018) found that 90% of all crime concentrated at 20% of CIR lots.

Table 3.1 Top Five Residential Land Use Subtypes Rank Ordered by Rates of Crime

Crimes against property	Crimes against persons
Mobile home park	Mobile home park
Stratified rental apartments – frame	Multi-family – garden apartments and row housing
Multi-family apartment blocks	Multi-family – apartment blocks
Strata lot residence (condo)	Multi-family – minimal commercial
Multi-family – conversions	2 Acres or more – manufactured homes

Table 3.2 Top Five Commercial Land Use Subtypes Rank Ordered by Rates of Crime

Crimes against property	Crimes against persons
Regional shopping centers	Regional shopping centers
Theater buildings	Theater buildings
Community shopping centers	Community shopping centers
Food markets	Hotels
Hotels	Motels and auto courts

Table 3.3 Top Five Civic, Institutional, and Recreational (CIR) Land Use Subtypes Rank Ordered by Rates of Crime

Crimes against property	Crimes against persons
Hospitals	Hospitals
Recreational and cultural buildings	Educational institutions
Educational institutions	Works yards
Works yards	Recreational and cultural buildings
Recreational clubs	Government buildings

When examining further crime counts across specific addresses, Wuschke and Kinney (2018) found that among the top five address with the highest counts of crime against property and persons, the city of Coquitlam's regional shopping center emerged as the top single address; 7% of property crimes and 4% of crimes against persons occurred at one single address. This is no surprise as shopping centers are target rich locations drawing the attention of motivated offenders.

In summary, their analysis across broad land use categories demonstrated that a disproportionate rate of crimes occurred on commercial land use. At the meso-level, or within group categories, residential land use experienced higher crime rates that were concealed in the broad land use categories, in addition to shopping centers, hospitals, and schools (Wuschke & Kinney, 2018). Likewise, when exploring single addresses the greatest concentrations were found at a particular shopping mall.

Research Questions

This study highlights concentrations of crime associated with specific land use types and addresses within Las Vegas, Nevada. Exploring two aggregate crime concentrations (i.e., property crimes and crimes against persons) at multiple spatial levels of analysis offers a more

nuanced understanding of the local connections between crime and land use. To explore crime concentrations at a variety of spatial levels in Las Vegas, Nevada, I present three research questions derived from Wuschke and Kinney's (2018) study and previous research. The current study seeks to answer the following research questions:

1: ***What top land use types and subtypes are associated with higher rates of property crimes and crimes against person in Las Vegas?***

Specific land use plays an important role in determining how, when, and by whom a location is used. In the original study, a vast majority of the City of Coquitlam is zoned for residential land use. Therefore, higher proportions of property crimes and crimes against persons were identified in residential land use categories (followed by commercial and civic, institutional, and recreational). However, in larger cities like Las Vegas, commercial properties, such as casinos, draw a higher concentration of people, thereby placing more potential victims in close proximity to motivated offenders (Smith et al., 2000). Additionally, Wuschke and Kinney (2018) found considerable variation in rates of both property crimes and crimes against person within the top three key land use classifications (residential, commercial, and CIR). While their research found higher concentrations of crime on commercial and CIR land use, the current study may demonstrate similar findings that suggest particular types of residential properties have higher rates of criminal activity at the meso-level of analysis. Therefore, when exploring broad land use categories, such as residential properties, we may find that condominiums experience more property crimes than mobile home parks, while crimes against persons may concentrate at an apartment complex. Likewise, we may also find that shopping centers

experience more property crimes, whereas schools experience a high rate of both property crimes and crimes against persons.

2: ***Does crime concentrate at specific addresses in Las Vegas? If so, does this change over time?***

Crime is rare (Kinney et al., 2008), but when it does occur, it does not concentrate uniformly. As such, the top single address for both property crimes and crimes against person is expected to emerge, as seen in the original study. Additionally, a small proportion of addresses associated with a large proportion of property crime and crimes against persons have shown to remain stable over time. This analysis will extend the original study by exploring the stability of crime concentration over a three-year time frame, compared by year.

3: ***Within groups of similar facilities, does a small proportion of the group account for the majority of crime?***

Empirical evidence demonstrates that within groups of similar facilities (e.g., bars, apartments, hotels), a small proportion of the group accounts for the majority of crime experienced by the entire group (Eck et al., 2007). These "risky facilities" represent the form of a J-curve in a bar graph, confirming the small proportion of the group hypothesis. This analysis and findings will extend the original research by identifying the degree to which crime concentrates across risky facilities in Las Vegas.

CHAPTER 4

METHODS

This is a study of crime concentrations and land use in Las Vegas, Nevada. It replicates and extends Wuschke and Kinney's (2018) research on the built environment, land use, and crime to explore local connections between land use in a large urban environment and two crime categories: property crimes and crimes against persons. This chapter overviews the data and methods for this study. The first section provides a detailed description of the study site in Las Vegas, Nevada. This is followed by a description of the land use data obtained from the Clark County Assessor's (CCA) Office and includes land use codes, categories, and definitions. The information is compared to Wuschke and Kinney's (2018) original land use definitions. A description of the crime data collected from the Las Vegas Metropolitan Police Department (LVMPD) is presented following the definitions. This chapter concludes with a discuss merging the two datasets to explore the connection between crimes against property and crimes against persons and specific land use.

Study Site

The current study is conducted in Las Vegas, Nevada. Las Vegas is internationally known as the entertainment capital of the world, drawing 42 million tourists per year to its resort corridor (lvcva.com). Las Vegas, Nevada, is located within Clark County in the southwest region of the United States. Also situated within Clark County is Moapa, Moapa Valley, Mesquite, Bunkerville, North Las Vegas, Henderson, Nelson/Boulder City, Good Springs, Searchlight, and Laughlin. While Clark County covers seven percent of the state's land mass, it holds 74% of the state's roughly 2.2 million residents.

The greater Las Vegas metropolitan area is home to over 1.7 million residents and experiences an average 3% yearly influx of new residents. The Las Vegas metropolitan area spans 476 square miles (populationstat.com). When most people say Las Vegas, they typically are referring to the resort corridor known as "the strip" or Las Vegas Boulevard, a 4.2-mile unincorporated area of Enterprise, Winchester, and Paradise (worldpopulationreview.com). Excluded from the study are the surrounding areas of Moapa, Moapa Valley, Mesquite, Bunkerville, North Las Vegas, Henderson, Nelson/Boulder City, Good Springs, Searchlight, and Laughlin because they are outside LVMPD's jurisdiction.

Guided by Wuschke and Kinney's (2018) research on the built environment, this study explores the connections between land use, property crimes, and crimes against persons. Beginning with address-matched crime and land use data, this study explores the relationship between the built environment and crime across multiple levels of aggregation—macro, meso, micro—in Las Vegas, Nevada.

It is important to note that Las Vegas, Nevada, and the city of Coquitlam are different in several aspects (see Table 4.1). First, the population of Las Vegas is larger than the City of Coquitlam. Second, there are a substantial number of businesses in Las Vegas that operate on a 24-hour basis. Businesses that hold gaming licenses such as restaurants and cocktail lounges (n=886) are required to remain open 24-hours. This provides a 24-hour opportunity for motivated offenders to come in contact with a potential target. Third, Las Vegas has more casinos per capita than any other city in the world. The casinos provide a rich environment for victimization of both property and persons. Additionally, Las Vegas is promoted as "Sin City," where "what happens in Vegas, stays in Vegas." Fourth, Coquitlam has a higher percentage of

married couples with children. Research indicates that marriage has a strong effect on desistance of crime (Sampson et al., 2006). This, coupled with the target rich environment of casinos, may contribute to greater crime rates in Las Vegas. Fifth, the racial distribution between the two cities differs in several aspects. Whereas both cities are predominantly white, Las Vegas has a more diverse population with a greater percentage of residents who identify as Black, other, or mixed race, and pacific islanders. Sixth, the median income is greater in Coquitlam, which is also reflected in housing prices and ownership (based on 100, 000 residents per capita).

Table 4.1 Demographics

	Las Vegas	Coquitlam
Population	641,903	140,028
Area	141.8 mi^2	47.22 mi^2
Median Age	37.8	40.7
Married Couples	48.3%	76%
White	61.88%	47.6%
Black or African American	12.23%	1.1%
Other race	12.12%	0.2%
Asian	6.86%	10.1%
Two or More Races	5.15%	1.7%
Native American/Aboriginal	0.95%	2.8%
Native Hawaiian or Pacific Islander	0.80%	N/A
Families With Kids at Home	31.9%	51%
Median Household Income	56,354	74,383
Home Ownership	101,481 (*15,809)	36,785 (*26,269)
Renters	72,269 (*11,258)	14,540 (*10,383)
Average Housing Price	364,900	866,539

*Standardized per 100,000 residents

Data Collection

Data in this study are collected from two sources: the Clark County Assessor's Office and the Las Vegas Metropolitan Police Department. The specific data collected are Clark County's parcel data, including tables that contain land use codes. Police data for property crime and crimes against persons were collected for 2018, 2019, and 2020.

Land Use Data

The Clark County Assessor's Office provided a shapefile for its land use data. A shapefile is a format for storing geometric location and attribute information for geographic features (ArcGIS.com). This agency is responsible for identifying, listing, and valuing all property subject to taxation within Clark County in addition to placing value on personal property, including large and small business, manufactured homes, aircraft, and any taxable personal property (clarkcountynv.gov). The Clark County Assessor's Office classifies land use into nine major categories (see Tables 4.2) and 138 detailed subcategories (see Table 4.3 through 4.9). Clark County's over 800,000 parcels are divided into 29 different residential land uses and 44 different commercial land uses.

Table 4.2 Las Vegas Land Use Codes, Categories, and Definitions

Land Use Code	Land Use Category	Definition
Category 1	Vacant	Parcels of land which no improvements exist.
Category 2	Single Family Residential	Parcels of land upon which improvements are used as a dwelling for one family.
Category 3	Multi-Residential	Parcels of land upon which improvements are designed for residential use by more than one family.
Category 4	Commercial	Parcels of land upon which improvements are used for the sale of goods and/or services or for the provision of community services, including recreational uses.
Category 5	Industrial	Parcels of land upon which improvements are used for the production and fabrication of durable and nondurable goods or products, for sales, service, or rental of heavy equipment or warehousing/storage facilities.
Category 6	Rural	Parcels used in the production of crops or livestock, open space qualified properties, or parcels in remote areas with low population density.
Category 7	Transportation, Communication, Utilities	Property used in or as a necessary adjunct to the provision of public services. The public services include transportation (i.e., airports), communications (i.e., phone companies) and other utilities (i.e., gas, electric, water, sewer).
Category 8	Mines	Property used in the extraction of minerals from the earth.
Category 9	Special Purpose	Special purpose or special use properties are also known as limited-market properties and include structures with unique designs, special construction materials, or layouts that restrict their functional utility to the use for which they were originally built. This includes parks, cemeteries, hospitals, and nursing homes.

(tax.nevada.gov)

Table 4.3 Within Land Use Tables: Single Family Residential

Category 2 Series: Single Family Residential	
Use Code	Primary Use Description
20.110	Single Family Residential
21.150c	SFR Unit in multi- unit building. Apartment use. Condo ownership
21.170c	SFR Unit in Multi Unit Bldg. Condo Ownership
22.110	Manufactured Home Converted to Real Property. SFR
23.185	Manufactured Home. Estates
23.188	Manufactured Home. Non-Estates
24.150	SFR Unit/Row House. Townhouse. Apartment Use
24.150c	SFR Unit/Row House. Townhouse. Apartment Use. Condo Ownership
24.160	SFR Unit/Row House. Townhouse
24.160c	Res Unit/Row House. Townhouse. Condo Ownership
26.110	SFR - Auxiliary Area. Secondary parcel from a split lot
27.100	SFR - Common Area
27.195	SFR - Improved Common Area
28.199	Residential Minor Improvements. Enclosed Structures
28.710	Residential Minor Improvements. Miscellaneous
29.110	Mixed Use with SFR as primary use

Table 4.4 Within Land Use Tables: Multi- Residential

Category 3 Series: Multi- Residential	
Use Code	Primary Use Description
30.120	Multi Family Res: Duplex
31.110	Multi Family Res: Two SFR Units
32.100	MFR 3 to 4 Units. Multiple Buildings
32.130	MF Res 3 to 4 Units. Main bldg. Triplex
32.140	MF Res 3 to 4 Units. Fourplex
32.140c	MFR 3 to 4 Units. Fourplex. Condo Ownership
33.100	MFR 5+ Units Low Rise (1-3 Story). Multiple Buildings
33.150	MFR 5+ Units Low Rise Apartments (1-3 story)
34.150	MFR 5+ Units High Rise Apartments (4+ story)
35.180	Manufactured Home Park 10+ units
36.100	MFR - Auxiliary Area; Secondary Parcel
37.100	Common Area - Multi Family
39.100	Mixed Use with Multi Family Res as primary use

Table 4.5 Within Land Use Tables: Commercial

Category 4 Series: Commercial	
Use Code	Primary Use Description
40.230	General Commercial. Heavy Equipment
40.330	General Commercial. General Services
40.330c	General Commercial. General Services. Condo Ownership
40.340	General Commercial. Entertainment
40.345	General Commercial. Recreational
40.350	General Commercial. Regional Shopping Center
40.355	General Commercial. Neighborhood Shopping Center
40.358	General Commercial. Retail Stores and Shops
40.359	General Commercial. Miscellaneous Wholesale and Retail
40.360	General Commercial. Restaurant and Cocktail Lounges
40.365	General Commercial. Food and Beverage Businesses
40.370	General Commercial. Automotive
40.375	General Commercial. Service Stations
40.378	General Commercial. Building and Construction
40.380	General Commercial. Recreational Vehicle Parks
40.399	General Commercial. Other Commercial
41.335	Offices, Professional and Business Services
41.335c	Offices, Professional and Business Services. Condo Ownership
41.338	Offices, Professional and Business Services. Financial
41.410	Offices, Professional and Business Services. Schools
41.420	Offices, Professional and Business Services. Religious
41.430	Offices, Professional and Business Services. Library and Museum
41.450	Offices, Professional and Business Services. Labor, Fraternal, and Social Organizations
41.460	Offices, Professional and Business Services. Government Facilities
42.310	Casino or Hotel Casino. Hotels - Class 1 Resort
42.311	Casino or Hotel Casino. Hotels - Class 2
42.312	Casino or Hotel Casino. Hotels - Class 3
42.325	Casino or Hotel Casino. Casinos
43.178	Commercial Living Accommodations. Timeshare - Single Unit
43.179	Commercial Living Accommodations. Timeshare – Multiple Units
43.320	Commercial Living Accommodations. Deluxe Motels
43.321	Commercial Living Accommodations. Motels
44.470	Commercial Recreation. Non-Profit Entertainment and Rec Facilities
45.346	Golf Course. Public
45.347	Golf Course. Semi-Private
45.348	Golf Course. Private
45.349	Golf Course. Resort
46.300	Commercial - Auxiliary Area
47.395	Commercial - Common Area
48.399	Minor Improvements on Commercial zoned land
48.720	Commercial Minor Improvements. Salvage
48.730	Minor Improvements on Commercial zoned land
49.330	Mixed Use with General Services Commercial as primary use
49.335	Mixed Use with Prof & Business Services Commercial as primary use

Table 4.6 Within Land Use Tables: Industrial

Category 5 Series: Industrial	
Use Code	Primary Use Description
50.210	Light Manufacturing
50.210c	Light Manufacturing. Condo Ownership
50.240	Light Manufacturing. Storage Facilities
51.200	Commercial Industrial
51.200c	Commercial Industrial. Condo Ownership
51.250	Commercial Industrial. Mini-Warehouse
52.210	Heavy Manufacturing
56.200	Industrial Auxiliary Area
57.200	Industrial – Common Area
58.730	Industrial Minor Improvements
59.200	Mixed Use with Industrial as Primary Use

Table 4.7 Within Land Use Tables: Rural

Category 6 Series: Rural	
Use Code	Primary Use Description
60.510	Agricultural; Qualified. Livestock
60.520	Agricultural; Qualified. Farming
60.530	Agricultural; Qualified. Dairy
60.540	Agricultural; Qualified. Poultry
60.550	Agricultural; Qualified. Timber
60.560	Agricultural; Qualified. Orchard
60.570	Agricultural; Qualified. Horticulture
60.580	Agricultural; Qualified. Apiary (Bee Keeping)
61.500	Agricultural; Not Qualified
62.999	Open Space
66.999	Rural Use with Auxiliary Area
67.999	Rural Use with Common Area
68.999	Rural Use with Minor Improvements
69.999	Mixed Use with Rural as Primary Use

Table 4.8 Within Land Use Tables: Communication, Transportation, Utilities

Category 7 Series: Communication, Transportation, and Utilities	
Use Code	Primary Use Description
70.610	Operating Communication, Transportation & Utility (state). Communication
70.620	Operating Communication, Transportation & Utility (state). Transportation
70.630	Operating Communication, Transportation & Utility (state). Utilities
71.610	Communication, Transportation and Utility (local). Communication
71.620	Communication, Transportation and Utility (local). Transportation
71.630	Communication, Transportation and Utility (local). Utilities
72.610	Communication
72.620	Transportation
72.630	Utilities
73.630	Alternative Energy
78.630	Locally Assessed Utility Use with Minor Improvements
79.630	Mixed Use with Locally Assessed Utility as Primary Use

Table 4.9 Within Land Use Tables: Special Purpose or Use Properties

Category 9 Series: Special Purpose or Use Properties	
Use Code	Primary Use Description
90.440	Parks for Public Use
91.330	Cemeteries
92.335	Hospitals and Skilled Nursing Homes
93.420	Special Purpose, Limited-Market Properties
93.430	Special Purpose, Limited-Market Properties. Library and Museums
93.450	Special Purpose, Limited-Market Properties
93.460	Special Purpose, Limited-Market Properties. Government Facilities
93.470	Special Purpose, Limited-Market Properties
96.400	Special Purpose Auxiliary Area
97.400	Special Purpose Common Area
98.400	Special Purpose Minor Improvements
99.400	Mixed Use with Special Purpose as Primary Use
99.999	Mixed Special Purpose/Other

Table 4.10 contains land use comparisons between Las Vegas and Coquitlam. To remain as true to the original study as possible, the “mine” land use category was excluded from the

current study and Las Vegas's Industrial, Transportation, Utilities, and Communication land uses will serve as the proxy for Industrial, Transportation, Utility (TCU) in the Coquitlam study.

Each record was contained within the provided County Assessor's shapefile. Because this study examines crimes at parcels, a geolocator was obtained by the Clark County Assessor's Office. The geolocator was uploaded to the map to remap crimes to specific parcels based on the recorded address. The land use dataset was spatially joined with the crime dataset based on address using the joins and relates function in ArcGIS Pro. ArcGIS Pro is a desktop geographical information system used for the purposes of exploring, visualizing, and analyzing spatial information. For the purposes of this study, the macro-level analyses include broad land use categories (or one of seven land use categories). The meso-level analyses include within category variations (or subgroups of land use), and the micro-level analyses include specific addresses.

Table 4.10 Land Use Comparisons and Definitions

Coquitlam, Vancouver, Canada, Land Use	Definition	Las Vegas, Nevada, United States, Land Use	Definition
Residential	Single structure and having one owner.	Single-Family Residential	Residential property that serves the primary purpose of providing a permanent dwelling for one family
Stratified Operational Facilities Area (SOFA)	Common properties within stratified housing complexes	Multi-residential	Duplex, condos, apartments, multifamily units
Commercial	Retail, office, and mixed use	Commercial	Entertainment, retail, office, casinos, mixed use
Industrial	Manufacturing or processing activity	Industrial	Production and fabrication of durable and nondurable goods or products, for sales, service, or rental of heavy equipment or warehousing/storage facilities
Transportation, Communication, Utility (TCU)	Transportation, Communication, and Utilities	Transportation, Utilities, and Communication (TCU)	Transportation, Communication, Utilities, Alternative Energy (warehouses, manufacturing, commercial industrial)
Civic, Institutional, Recreational (CIR)	Broad category of land use types, including park spaces, government buildings, schools, golf, and hospitals, healthcare, jails, etc.	Special Purpose or Use Properties (CIR)	Parks for public use, cemeteries, hospitals and skilled nursing homes, library and museums, government facilities
Farm	Crop production, livestock farming, and dairying	Rural	Livestock, farming, dairy, poultry, timber, orchard, open space

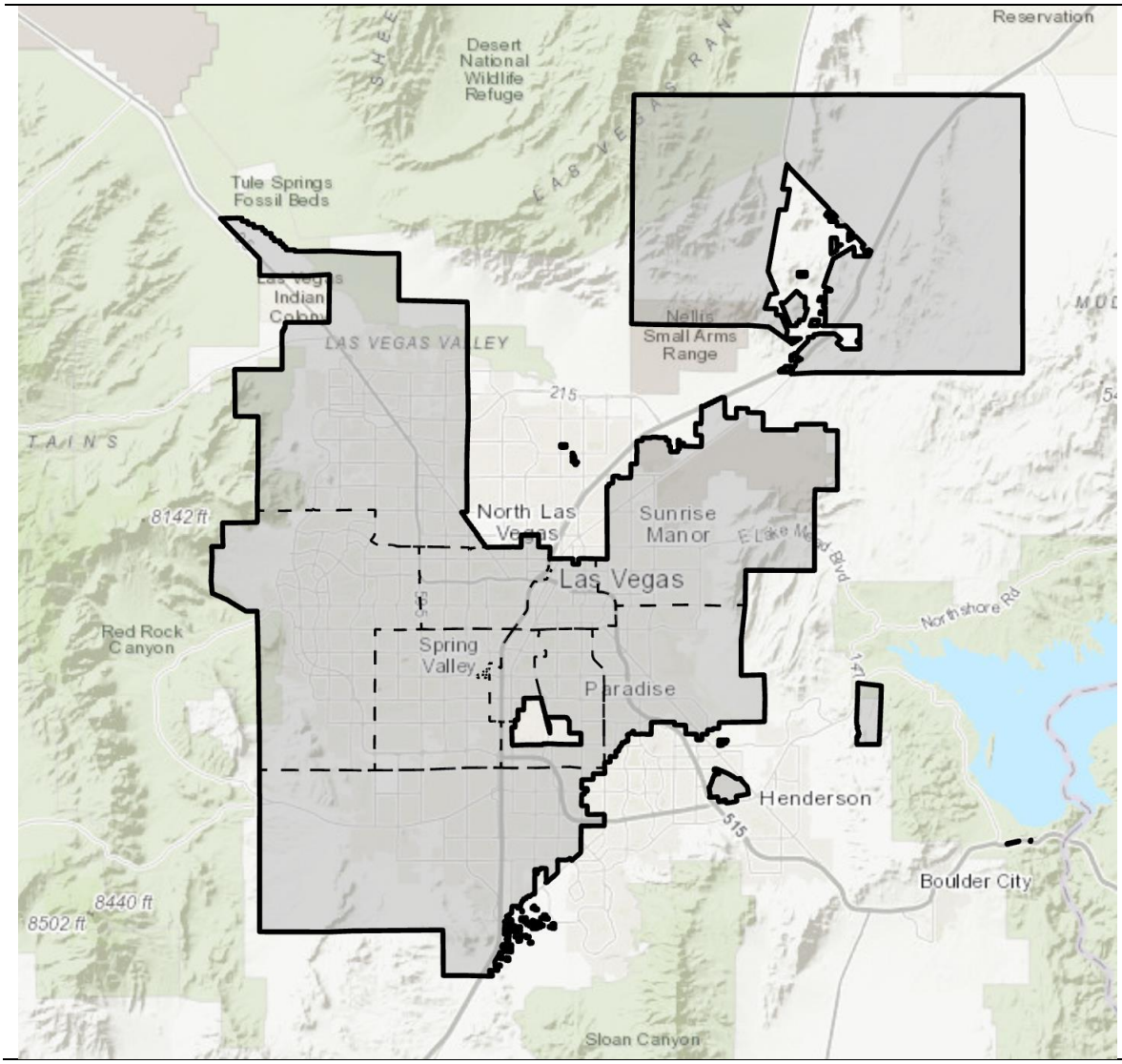
(Lasvegasnevada.gov, 2021)

Crime Data

Crime data for 2018, 2019, and 2020 was obtained from the Las Vegas Metropolitan Police Department (LVMPD). In an *International Journal of Geo-Information* study examining the effect of land use and crime, Matijosaitiene et al. (2019) noted that the three-year time frame is the most commonly used time frame when addressing crime and urban planning. They state that "crime data for 2–3 years is considered enough data for crime analytics and predictions/forecasting, especially when the crime is analyzed in terms of urban planning" (Matijosaitiene et al., 2019, p. 3). As such, I used a three-year time frame to assess stability of crime for the current study.

LVMPD serves the city limits and Clark County, Nevada. Because most of Clark County's population resides in the Las Vegas Census County divisions, the surrounding areas of Moapa, Moapa Valley, Mesquite, Bunkerville, North Las Vegas, Henderson, Nelson/Boulder City, Good Springs, Searchlight, and Laughlin are excluded. After eliminating these surrounding areas, the jurisdiction of interest for this study represents 520,643 parcels. The LVMPD area command coverage was provided in a shapefile (as seen in Figure 4.1).

Figure 4.1 LVMPD Jurisdiction



To replicate Wuschke and Kinney's (2018) study, I included all property crimes and crimes against persons from the data that could be geocoded to specific addresses. These serve as the dependent variables.

Table 4.11 2018 Crime Data

Crimes against property	*n*	Crimes against persons	*N*
Burglary	8167	Aggravated assault	2396
Larceny-theft	19011	Sexual assault	796
Motor vehicle theft	5043	Murder	100
		Robbery	1293

The crime report data used in this research includes only recorded crime incidents. While LVMPD receives over one million calls for service annually, only about 40,000 recorded crime incidents are documented yearly. Crime reports are generated when a police officer responds to a call for service and an official report is recorded. Because crime reports do not include unfounded incidents, they are considered a more reliable form of data for the examination of crime and land use.

Merging Datasets

To explore the connection between land use and crime, land use data was spatially joined to crime records (the address recorded as the event location). Merging the two datasets matched crime event addresses with land use classifications to provide rich details of crime events and their locations. LVMPD's jurisdiction was then clipped to the parcel and crime data, and any outlying parcels and crimes were removed.

In the original study, Wuschke and Kinney (2018) argued that because each property is listed as a unique record, it would result in different recording practices for similar land use types. For instance, shopping complexes with one owner are listed as one record, whereas complexes with individually owned units resulted in separate records for each property. To maintain consistency across similar land uses, they merged data according to land use and address category to produce one record for each land use at a given address. For example, if a

shopping complex had multiple storefronts for lease, each event at a leased space, rather than the shopping complex as a whole, counted as a unique crime record. To maintain consistency, the shopping complex as a whole was considered commercial land use and crime counts were aggregated to the specified land use. Likewise, because each building or individual condo in a condominium complex can be separately owned, the crime count within the condominium complex was considered the crime count for the specified land use, not for the individual unit. Therefore, all data were merged to one record according to address and land use category to maintain consistency when comparing similar property types.

LVMPD uses Geographical Information Software (GIS) to geocode their crime incidents. As such, all data were provided in a shapefile. Data provided for 2018 included 48,457 property crimes and crimes against persons. Because LVMPD geocodes crime to the street centerline using *X Y* coordinates, the data for this study was manually rematched from the *X Y* coordinates to the corresponding parcel address (using a geolocator provided by the county assessor's office) in ArcGIS Pro 2.8.0. To ensure geocoding accuracy, crime address data were manually cleaned to remove errors in street name, number, street type, and direction. The assessor's geocoded parcel data was spatially joined to the crime data in LVMPD's jurisdiction. All events that fell outside of LVMPD's jurisdiction, any offense that did not have an address (intersection, or unknown), and any offense that occurred at an area command or detention center were removed. Crime that fell on land use classified as vacant and mines were also removed, leaving 29,853 property crimes and 4,167 crimes against persons (60% of total incidents). Once crimes were geocoded to the parcel and the crime tables were joined to the assessor's data, lots

without assigned parcel numbers were removed from the dataset resulting in a total of 433,515 parcels (83% of total parcels).

Analytical Plan

This study explored land use and crime rates at the macro (broad land use), meso (subgroups within broad land use categories), and micro (addresses) level using ArcGIS Pro 2.8.0. Rates were derived from frequencies of crimes per lot using SPSS 27. To calculate a rate, one variable was used to determine the difference between the value of another variable. In this case, the number of crimes in an area was divided by the number of parcels in the assigned land use category.

To address which top land use types are associated with higher rates of property crimes and crimes against person in Las Vegas, I explored rates of crime against property per lot and rates of crime against persons per lot across the seven broad land use categories in Las Vegas (e.g., single family residential; multi-residential; commercial; TCU; special purpose (CIR); and rural) in SPSS 27. In line with the original study, the top three broad land use categories that emerged with the highest crime counts were mapped for display and drove the subsequent analysis of within land use crime patterns. While crime rates in the original study were highest at residential, commercial, and CIR land use categories, I anticipated that rates could differ given the differences between cities examined.

The top three land uses associated with higher rates of both property crime and crimes against persons directed subsequent analysis at the meso-level. Using SPSS 27, this analysis explored how crime against property and crimes against person concentrate per lot across the within land use categories in Las Vegas. Within the top three broad land use categories of the

original study, five land use subtypes emerged with the highest rates of both property crimes and crimes against persons per lot. In line with the original study, I identified the top five land use subtypes with the highest rates of crime events per lot in Las Vegas.

Drawing from the meso-analysis, my micro-level analysis explored the land use of the top five addresses with the highest counts of property crimes and crimes against persons by examining the frequency of crime counts per address. In line with previous research, analysis at the micro-level will produce further clarity of local hot spots that the macro- and meso-level analyses concealed. Because crime is known to concentrate temporally, I examined the stability of crime concentration in Las Vegas over a three-year timeframe. To determine the stability of crime at a place, I conducted a growth curve analysis using Mplus 8 software to trace crime trend changes over time for the top two land use categories with the highest crimes counts against property and persons.

A growth curve analysis is a statistical method for analyzing change over time (Frey, 2018). Data is collected from multiple time points to explore crime trends over time, and any variations in those changes. For the purposes of this dissertation, growth curve analysis focuses on the similarities between, and differences among, the top two land use categories.

Using the micro-level analysis results, I also explored within group variation to determine if a small proportion of the group (risky facilities) accounts for the majority of the crime in Las Vegas. Once the facility type with the greatest number of crimes over a one-year timeframe was identified, all those facilities across the study area were rank ordered based on facilities with the most amount of crime to those with the least amount of crime (Eck et al.,

2007). I conducted this analysis to determine if results would be consistent with the “iron law of troublesome places” (Wilcox and Eck, 2011).

CHAPTER 5

FINDINGS

This study focused on the relationship between land use and crimes against property and persons. More specifically, analyses sought to answer the following questions:

1. What top land use types and subtypes are associated with higher rates of property crimes and crimes against person in Las Vegas?
2. Does crime concentrate at specific types of addresses in Las Vegas? If so, does this change over time?
3. Within groups of similar facilities, does a small proportion of the group account for the majority of crime?

The data required for these analyses consist of parcels provided by the Clark County Assessor's Office and crime data from LVMPD for 2018, 2019, and 2020 as mapped in ArcGIS Pro. A series of cross tabulations were conducted to examine the frequency at which property crimes and crimes against persons occurred. Rates were then derived from the frequencies of crimes and number of parcels in a given category. To extend the original study, I explored changes in crime percentages over time at addresses that emerged with the highest property crimes and crimes against persons using a growth curve model. I also examined whether some places that emerged as the having the highest counts of crime against property and persons are more "risky" than others within homogonous sets of facilities by (a) grouping similar facilities according to land use category and (b) rank ordering them by those who experience the most crime to those that experience the least crime.

Land Use at the Macro-Level

Once the data were manually cleaned, tables from the County Assessor's Office were joined to the crime and parcel data to provide greater land use details. After land use information was joined to the parcels, data were exported into tables using the table to Excel function in ArcGIS Pro. The Excel table was uploaded to SPSS to analyze frequencies and rates of crimes against property and persons across land use categories (table 5.1). Specifically, I aimed to determine what top land use types and subtypes are associated with higher rates of property crimes and crimes against persons in Las Vegas. The results follow.

Illustrated in Table 5.1, 95% of parcels within LVMPD's jurisdiction are classified as single family residential. A smaller proportion of LVMPD's jurisdiction are classified as commercial (3.42%) and multi-residential (1.38%). A significantly smaller proportion of parcels fall into less than one percent of the total lots classified as industrial, TCU, CIR, or rural. Crime trends against property follow a similar pattern with most events occurring on commercial land use, single family residential, and multi-residential properties. When examining criminal events per lot, however, a more detailed picture emerges. While a vast majority of parcels in LVMPD's jurisdiction are single family residential lots, these lots only experience 36.88% of property crimes (.03 crimes per lot). In comparison, TCU, industrial, and commercial lots experience a disproportionate amount of property crime per lot. Even though single-family residential lots make up the majority of LVMPD's jurisdiction, TCU lots experience more property crimes (.98 per lot).

Crimes against persons occurred less often than property crimes with trends that differ from property crimes. Within LVMPD's jurisdiction, .29 crimes against persons per CIR lot

occurred compared to .17 crimes against person per multi-residential lot, and .11 crimes against person per commercial lot. In order of magnitude, violent crime rates are greater on CIR, multi-residential, commercial, rural, industrial, TCU, and single-family residential properties.

Table 5.1 Macro-Level Analysis: Crimes Against Property and Crimes Against Persons by Broad Land Use Category

Land use	Lots	% Of all lots	Crimes against property	% Of crimes against property	Crimes against property /lot	Crimes against persons	% Of crimes against persons	Crimes against persons /lots
Single residential	411,415	95	11,010	36.88	.03	1373	32.94	.00
Commercial	14,830	3.42	13711	46.00	.92	1660	39.84	.11
Multi-residential	5,978	1.38	4,040	13.53	.67	1049	25.17	.17
TCU	543	.13	518	1.74	.98	8	.19	.01
Industrial	500	.115	475	1.60	.95	36	.86	.07
CIR	235	.05	98	.33	.42	40	.96	.17
Rural	14	.00	1	.00	.07	1	.18	.07
Grand Total	433,515	100.00	29,853	100.00		4,167	10	**.60

**This number only represents the total of the column.

Macro-level trends in LVMPD's jurisdiction show that over 99% of land use is designated as single family residential, commercial, and multi-residential, with over 96% of property crimes and crimes against persons occurring on these properties. But as Table 5.1, demonstrates, crimes are not evenly distributed across categories. Crimes against property clearly occur more often than crimes against persons. Compared to residential properties, TCU, industrial, and

commercial properties have a disproportional crime rate per lot, as do CIR and multi-residential.

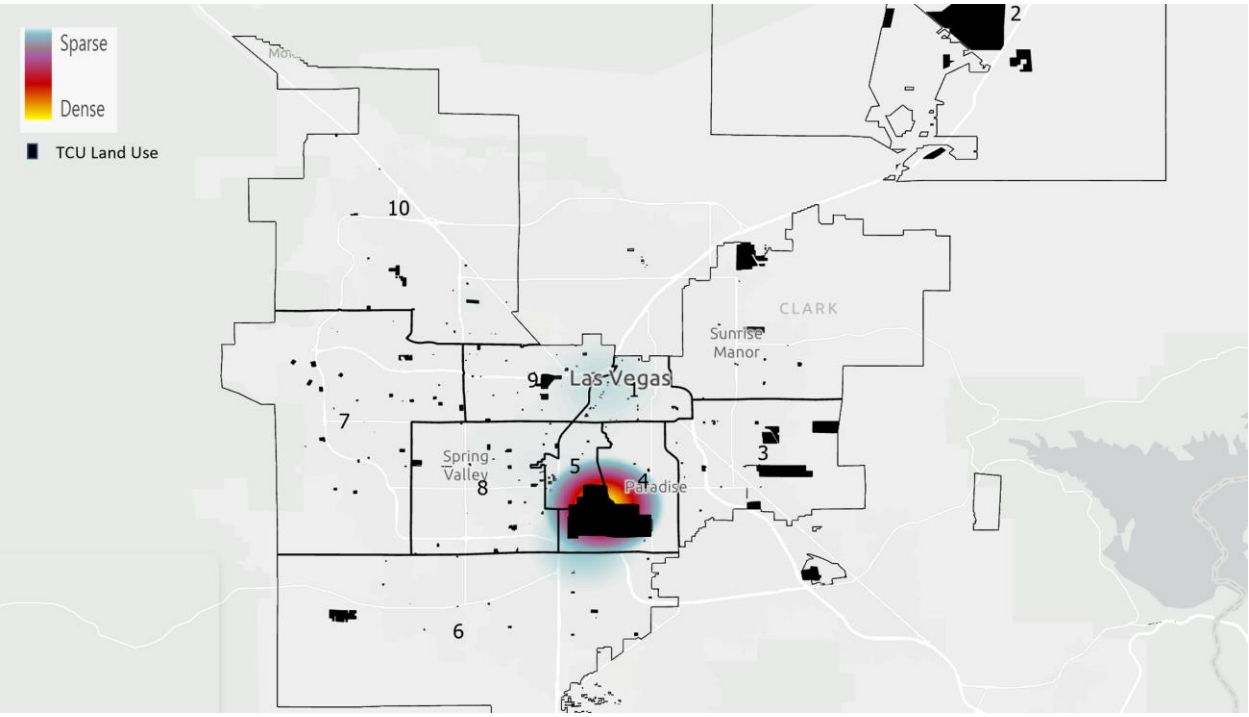
Maps are displayed using the Local Moran's I function in ArcGIS Pro. Local Moran's I is a statistical analysis used to identify spatial clusters with high or low values and spatial outliers within a defined geographical location. This type of analysis allows for the identification of significant spatial clustering around an individual location (Anslen, 1995). Local Moran's I relies on Local Indicators of Spatial Association (LISA), which has two properties: (1) a statistic for each location, and (2) the sum of a local statistic. By examining the statistic for each location and the sum across locations, clusters of High-High, High-Low, Low-Low, and Low-High are identified. This is used as the basis of the null hypothesis of no local spatial association.

The first three maps (Figures 5.1-5.3) display the spatial distribution of crimes against property according to the top three broad land use categories identified in Table 5.1. The subsequent three maps (Figures 5.4-5.6) display the spatial distribution of crimes against persons. The concentrations depicted within land use types reveal differences according to crime type. While the spatial distribution for crimes against TCU are highly concentrated, crimes against industrial land use are more disbursed across Las Vegas. This dispersion is also prevalent when examining crimes against property on commercial land use.

As for crimes against persons, the spatial distribution shows some similarities to property crimes. The spatial distribution of crimes against persons on CIR land use displays dispersion but with a high concentration in one location. However, crimes against persons on multi-residential land use are more disbursed across Las Vegas. Still, when examining crimes against persons on commercial land use, they concentrate in an area close to Las Vegas

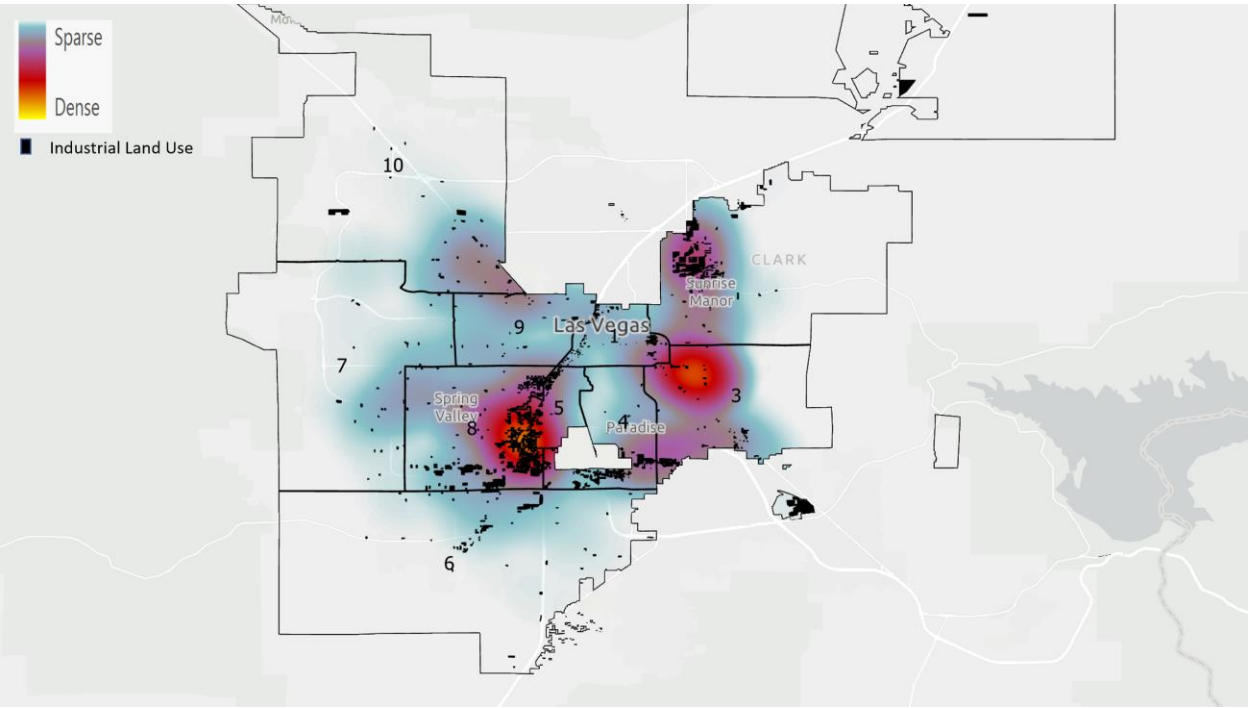
Boulevard (the “strip”). Macro-level results show that property crimes and crimes against persons cluster on TCU, CIR, and commercial land use. These maps illustrate that there may be further clustering within land use categories. This finding directs subsequent analyses.

Figure 5.1 Spatial Distribution of Crimes Against Property on TCU Land Use



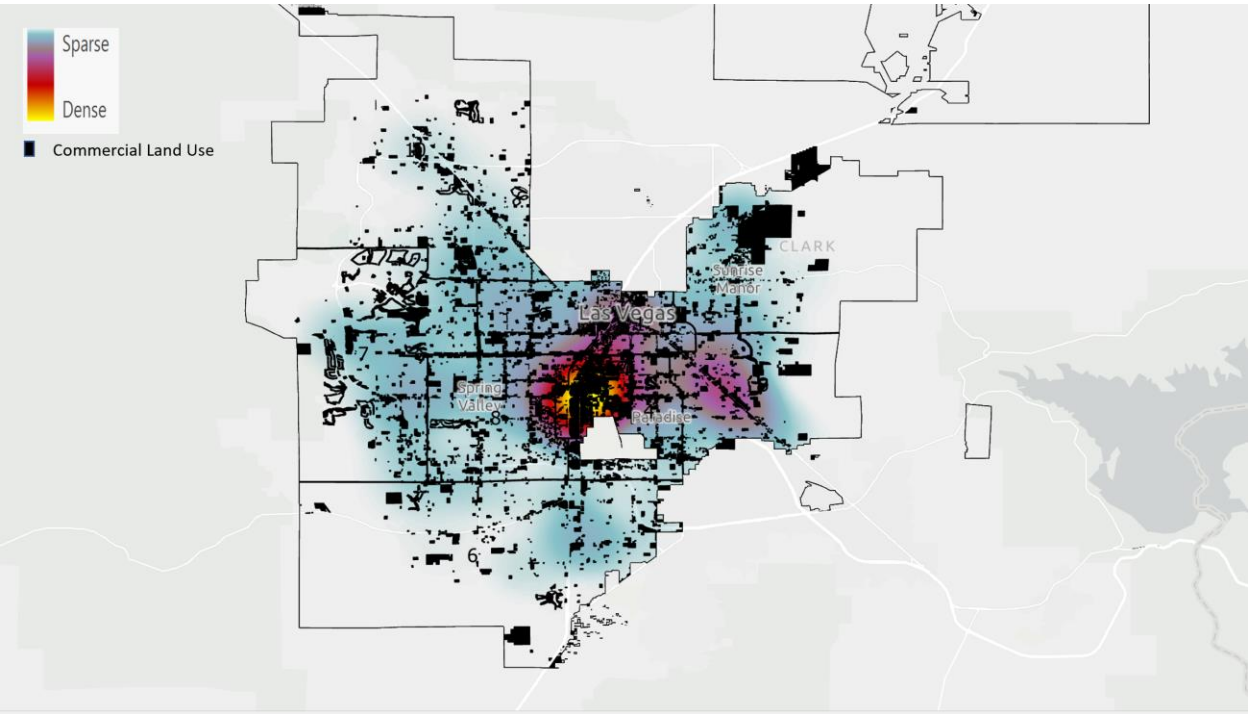
(The numbers in the map represnet LVMPD’s area commands: (1) Downtown area command, (2) Northeast area command, (3) Southeast area command, (4) Southcentral area command, (5) Convention center area command, (6) Enterprise area command, (7) Summerlin area command, (8) Spring valley area command, (9) Bolden area command, (10) Northwest area command)

Figure 5.2 Spatial Distribution of Property Crimes on Industrial Land Use



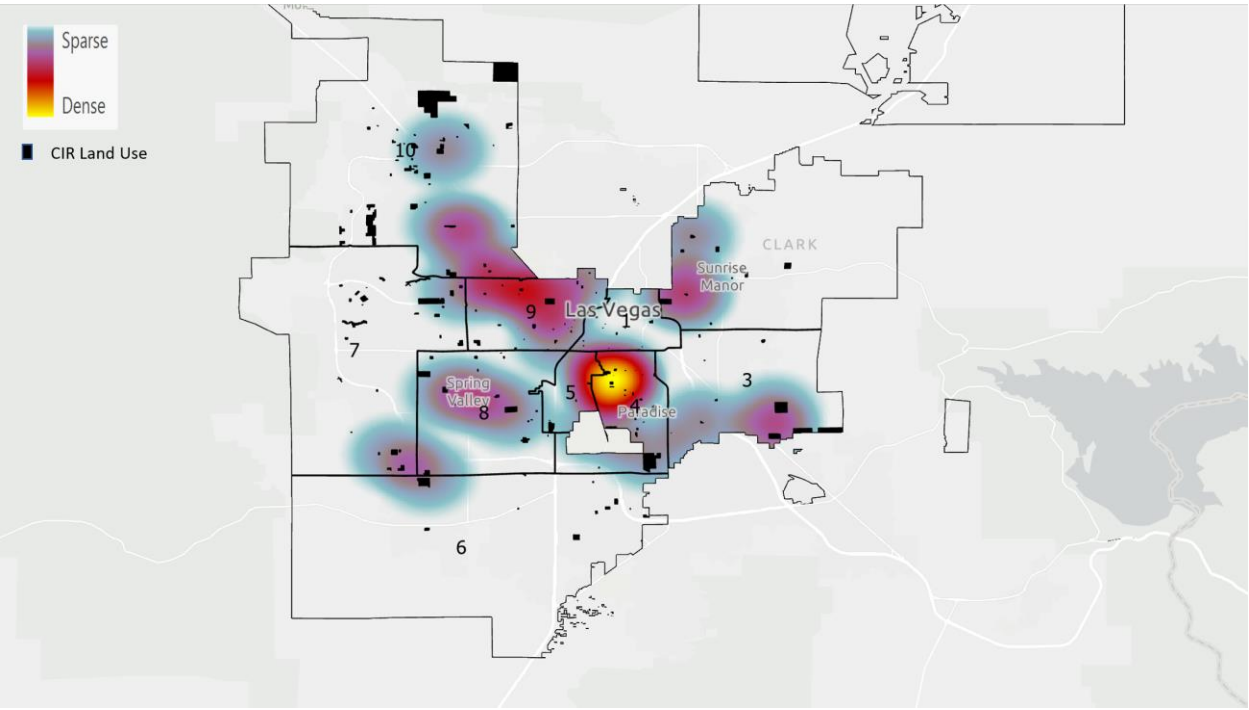
(The numbers in the map represnet LVMPD's area commands: (1) Downtown area command, (2) Northeast area command, (3) Southeast area command, (4) Southcentral area command, (5) Convention center area command, (6) Enterprise area command, (7) Summerlin area command, (8) Spring valley area command, (9) Bolden area command, (10) Northwest area command)

Figure 5.3 Spatial Distribution of Property Crimes on Commercial Land Use



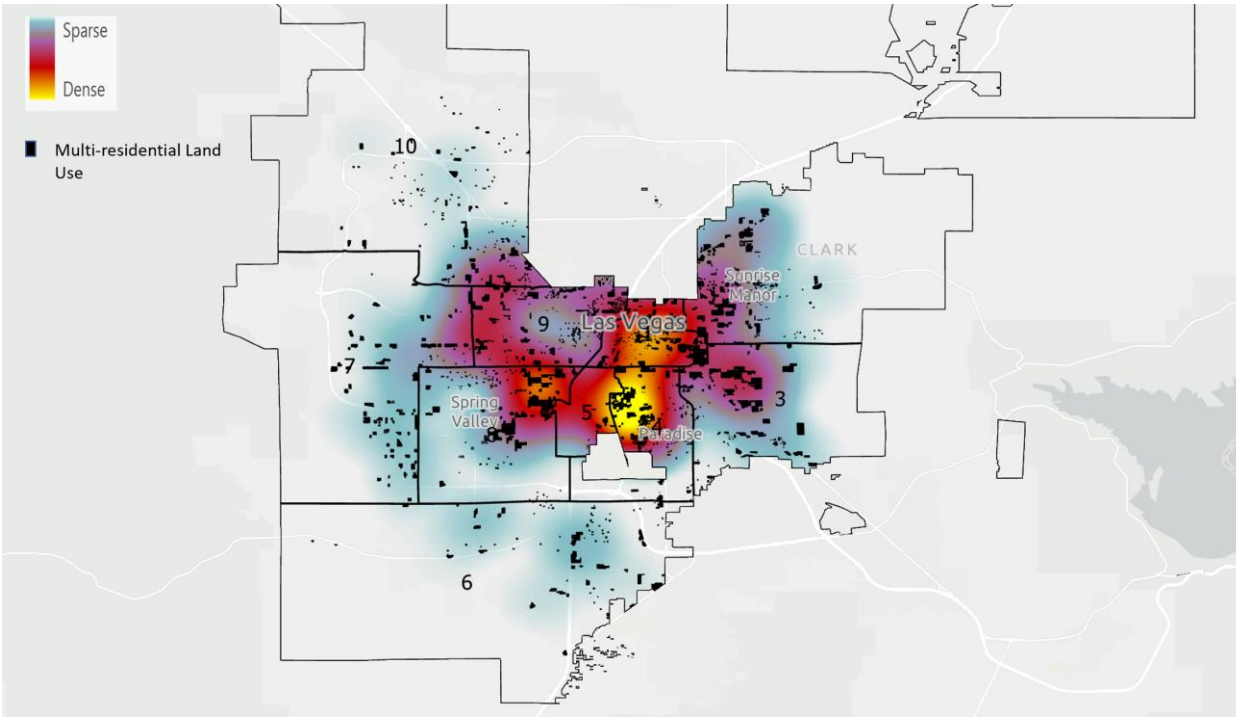
(The numbers in the map represnet LVMPD's area commands: (1) Downtown area command, (2) Northeast area command, (3) Southeast area command, (4) Southcentral area command, (5) Convention center area command, (6) Enterprise area command, (7) Summerlin area command, (8) Spring valley area command, (9) Bolden area command, (10) Northwest area command)

Figure 5.4 Spatial Distribution of Crimes Against Persons on CIR Land Use



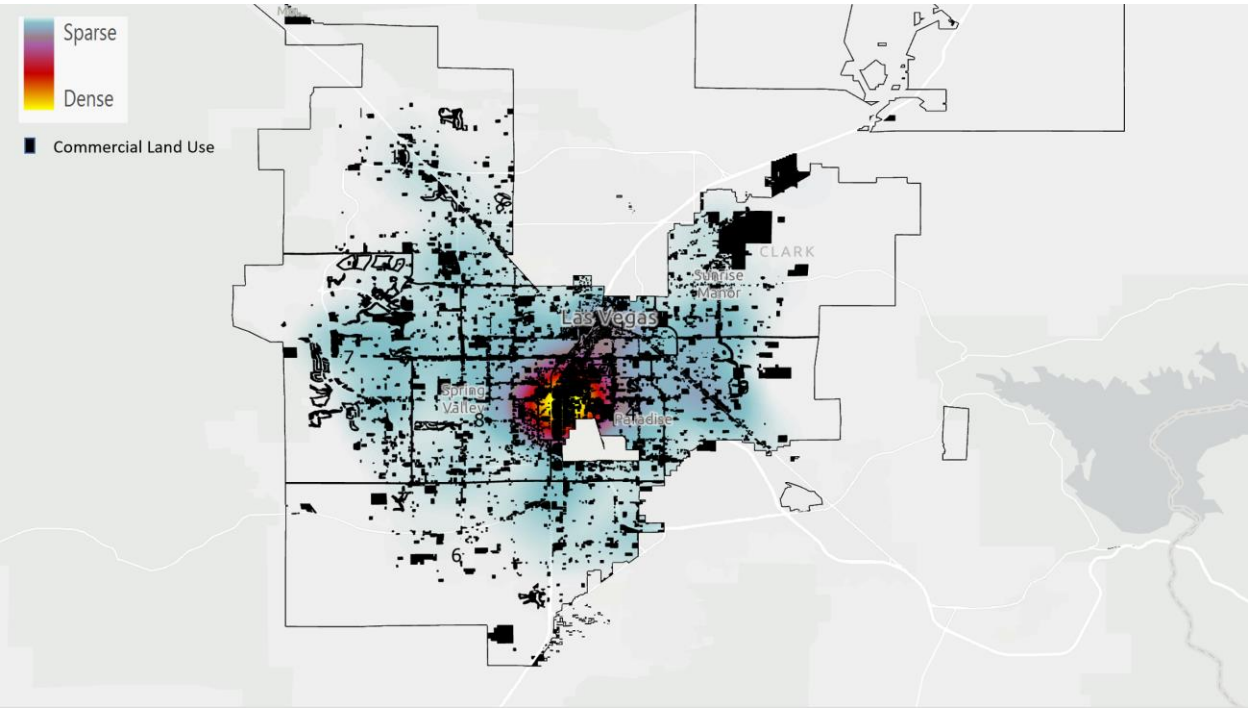
(The numbers in the map represnet LVMPD's area commands: (1) Downtown area command, (2) Northeast area command, (3) Southeast area command, (4) Southcentral area command, (5) Convention center area command, (6) Enterprise area command, (7) Summerlin area command, (8) Spring valley area command, (9) Bolden area command, (10) Northwest area command)

Figure 5.5 Spatial Distribution of Crimes Against Persons on Multiresidential Land Use



(The numbers in the map represnet LVMPD's area commands: (1) Downtown area command, (2) Northeast area command, (3) Southeast area command, (4) Southcentral area command, (5) Convention center area command, (6) Enterprise area command, (7) Summerlin area command, (8) Spring valley area command, (9) Bolden area command, (10) Northwest area command)

Figure 5.6 Spatial Distribution of Crimes Against Persons on Commercial Land Use



(The numbers in the map represnet LVMPD's area commands: (1) Downtown area command, (2) Northeast area command, (3) Southeast area command, (4) Southcentral area command, (5) Convention center area command, (6) Enterprise area command, (7) Summerlin area command, (8) Spring valley area command, (9) Bolden area command, (10) Northwest area command)

Meso-Level Analysis: Within Category Variation

Macro-level analysis displayed a connection between crime and broad land use categories. While the density maps also suggest that variation exists within these broad land use categories, are these concentrations evident when exploring within land use categories? To answer this question, the geospatial dataset was exported from ArcGIS Pro in the form of an Excel table using the table to Excel function. The Excel table was then uploaded into SPSS. In SPSS, crosstabulations were run to explore the frequency of crimes for each within land use category. Tables 5.2 through 5.7 illustrate variations in crimes against property and persons within the top broad land use classifications (TCU, industrial, CIR, multi-residential and commercial). Each of the following tables displays the top five land use subtypes with the

highest rates of crime per lot (identified at the macro-level) in order of crimes against property followed by crimes against persons. The land use classifications are determined by the Clark County Assessor's Office. While the vast majority of Las Vegas consists of residential lots (n= 411,415; multi-residential n=5,978), a different picture emerges when exploring within land use categories. As depicted in Tables 5.2 and 5.3, not all TCU properties and CIR experience a low crime rate. Tables 5.4 through 5.7 also demonstrate variation between commercial, industrial, and multi-residential land use subtypes.

In Table 5.2, findings reveal that the transportation land use subcategory displays high concentrations of crimes against property per lot. Transportation land use is defined as aircraft, railroad, bus, taxicab, truck and marine terminals and depots, freight docks, storage compound and other related facilities in Las Vegas. While crimes concentrate at one crime per lot on transportation land use, crime is also disproportionately concentrated within communication and utilities subgroup land use categories.

There is a considerable amount of variation in crimes against persons per CIR lot (Table 5.3) within the subgroup categories. Public use parks land use and hospitals have a disproportionate number of crimes against persons. CIR lots are also referred to as special purpose lots in Las Vegas. Special purpose, as defined by the Clark County Assessor's Office, applies to limited-market properties, and generally includes structures with unique designs, special construction materials, or layouts that restrict their functional utility to the use for which they were originally built.

Table 5.2 Top Five TCU Land Uses, Sorted by Rate of Crimes Against Property

Land use subcategory	Lots	% Of TCU lots (*n*=543)	Crimes against property	% Of crimes on TCU lots (*n*=518)	Crimes against property / lot
Transportation	505	93.00	500	96.53	1
Utilities	14	2.58	11	2.12	.79
Communication	8	1.47	7	1.35	.88
Alternative energy	5	0.92	0	0	0
Operating Communication, Transportation & Utility	2	0.37	0	0	0
Total	543	100	518	100	

Table 5.3 Top Five CIR Land Uses Sorted by Rate of Crimes Against Person Per Lot

Land use subcategory	Lots	% Of CIR lots (*n*=235)	Crimes against property	% Of crimes on CIR lots (*n*=87)	Crimes against property/ lot
Public use parks	151	64.26	75	86.20	.50
Hospitals/nursing home	73	31.06	9	10.34	.12
Special purpose	6	2.55	3	3.45	.50
Special purpose, minor improvements	3	1.27	0	.00	.00
Special purpose, limited market	2	.85	0	.00	.00
Total	235	100	87	100	

Las Vegas' commercial lots (Tables 5.4 and 5.5) display the highest counts of crime compared to other land use types. Commercial parcels, as defined by the Clark County Assessor's Office, are parcels of land upon which improvements are used for the sale of goods and/or services or for the provision of community services, including recreational uses. Upon examining within group variation, crimes against property occur more often at class 1 resorts.

Class 1 resorts are defined as hotel accommodations with elaborate grounds. They may include some or all of the following features: shops, gaming (gambling), restaurants, bars, pools, tennis courts, golf course, or other facilities normally associated with resort hotels. Millions of visitors a year are drawn to Las Vegas's class 1 resorts making this a target rich environment. Commercial lots also experience a substantial amount of crime against persons. While retail shopping centers have a greater count of crimes against persons, restaurants and cocktail lounges have the highest rate per lot.

Table 5.4 Top Five Commercial Land Uses, Sorted by Rate of Crimes Against Property Per Lot

Actual land use subcategory	Lots	% Of commercial lots (n= 14,830)	Crimes against property	% Of crimes on commercial lots (n= 13,711)	Crimes against property/ lot
Hotel, class 1 resort	3,964	26.73	3,693	24.53	.93
Retail store shopping	3,611	24.35	3,165	23.10	.876
Neighborhood shopping center	1,644	11.09	1,444	10.53	.878
Hotel, class 2	915	6.17	844	6.16	.922
Office professional	904	6.10	832	6.07	.920
Total	11,038	*74.44	9,978	*70.39	

*These do not total 100% because only the top five land use subcategories are being examined.

Table 5.5 Top Five Commercial Land Uses, Sorted by Rate of Crimes Against Person Per Lot

Land use subcategory	Lots	% Of commercial lots (n= 14,830)	Crimes against person	% Of crimes on commercial lots (n= 1,597)	Crimes against person/ lot
Retail store shopping	3,611	24.35	446	27.93	.12
Hotel, class 1 resort	3,964	26.73	271	16.97	.07
Restaurants and cocktail lounges	590	3.98	119	7.45	.20
Neighborhood shopping center	1,644	11.09	200	12.52	.12
Motel	705	4.75	117	7.33	.17
Total	10,514	*70.90	1,153	*72.20	

*These do not total 100% because only the top five land use subcategories are being examined.

Las Vegas' industrial lots (Table 5.6) also display property crime concentrations. The industrial land use classification applies to parcels of land upon which improvements are used for the production and fabrication of durable and nondurable goods or products, for sales, service, or rental of heavy equipment or warehousing/storage facilities. Even though storage facilities have the greatest number of crimes against property, both storage facilities and light manufacturing have high rates of crime per lot.

As for multi-residential properties, high rates of crimes against persons are exhibited in Table 5.7. To understand this in context, each lot represents one classification of land use (not the number of units on the lot). This means that the high number of crimes per lot indicates the number of lots, not the number of potential targets. These findings should be interpreted carefully. Multi-residential lots only make up 1.5% of all total residential lots in Las Vegas. When multi-residential lots are teased out of single-family lots, their crime concentrations are dispersed: 94% of crimes against persons occur at 80% of multi-residential properties.

However, when all residential lots are combined, both single and multi-family, 59% of crimes against persons occur on only four percent of the total residential lots.

Table 5.6 Top Five Industrial Land Uses Sorted by Rate of Crime Against Property Per Lot

Land use subcategory	Lots	% Of industrial lots (n=500)	Crimes against property	% Of crimes on industrial lots (n=475)	Crimes against property/ lot
Storage	392	78.40	373	78.52	.95
Light manufacturing	99	19.80	94	19.79	.95
Common industrial	8	1.6	7	1.47	.88
Minor Improvements	1	.20	1	.21	1
Common area	0	0	0	0	0
Total	500	100	475	100	

Table 5.7 Top Five Multi-Residential Land Uses Sorted by Rate of Crime Against Persons Per Lot

Land use subcategory	Lots	% Of multi-residential lots (n= 5,798)	Crimes against person	% Of crimes on multi-residential lots (n= 1,049)	Crimes against person/ lot
Low rise apartments	3,802	63.60	768	73.21	.20
Fourplex (3 to 4 units)	517	8.65	135	12.87	.26
Manufactured home Park 10 + units	315	5.67	60	5.72	.19
Duplex	44	.76	13	1.24	.30
MFR Five + units	37	.64	14	1.33	.38
Low rise apartments	3,802	*79.32	990	*94.37	

*These do not total 100% because only the top five land use subcategories are being examined.

Micro-Level Results: High Crime Addresses

Crimes against property in Las Vegas concentrate in high rates on CIR, commercial, and multi-residential land use. When exploring the meso-level analysis between crimes against property, findings demonstrate that crimes against property concentrate at transportation hubs, class 1 resorts, and storage facilities. As for crimes against persons, the meso-level analysis depicts crime rates are higher on special purpose land use, restaurants and cocktail lounges, and multi-residential lots with five or more units (one to three stories). While the macro (or broad land use) analysis shows some high rates of crime per lot, the meso-level analysis shows that these concentrations occur at specific land use subtypes. This finding suggests that further exploration is needed to identify concentrations at proprietary land use.

Tables 5.8 and 5.9 portray the top five proprietary land use types in Las Vegas with the highest counts of property crime and crime against persons in Las Vegas for 2018. The top land use category with the highest count of crime against property in Las Vegas is class 1 resorts (commercial). Approximately thirteen percent of all crimes against property concentrate in this environment. Because the Las Vegas mega resorts are located in the heart of the city, they bring a substantial number of potentially rich targets to one location to enjoy gambling, drinking, dancing, eating, and leisure activities by the pools. The top land use category with the highest counts of crimes against persons in Las Vegas is low-rise apartments (residential) with roughly eight percent of all crimes against persons concentrating in this environment. While crimes against property are greater on class 1 resorts, crimes against persons are also just over four percent in these target rich environments. In contrast, class 2 resorts experience a low volume of crimes against property. Retail stores and neighborhood shopping centers also account for the top crime locations in Las Vegas for 2018.

The remaining high crime proprietary places are similar according to crime type. Four out of the five property crime locations are commercial and concentrate at casinos and shopping centers. Similarly, four out of the five and violent crime locations are also commercial and concentrate at casinos and shopping centers, but motels are also disproportionately affected. It is important to note that all of the top crime locations in Las Vegas provide an environment for motivated offenders to converge with potential targets. While casinos are target rich environments for both property and violent crime, they draw an influx of over 42 million visitors that may be unfamiliar with the environment. However, neighborhood shopping centers allow for offenders to take advantage of known criminal opportunity structures because they are more likely to move through these environments on a routine basis. These findings emphasize the importance of micro-level analysis.

Table 5.8 Top Five Proprietary Places Sorted by Frequency of Crimes Against Property

Proprietary land use description	Broad land use category	Crimes against property	% Crimes against property (*n*=29,853)
Casino, class 1 resorts	Commercial	3,784	12.67
Low rise apartments	Residential	3,463	11.60
Retails stores and shops	Commercial	3,319	11.18
Neighborhood shopping center	Commercial	1,512	5.06
Casino, class 2 resort	Commercial	864	2.89
Total		12,942	43.40

Table 5.9 Top Five Proprietary Places Sorted by Frequency of Crimes Against Person

Proprietary land use description	Broad land use category	Crimes against person	% Crimes against person (*n*=4,167)
Low rise apartments	Residential	339	8.13
Retail stores and shops	Commercial	292	7.00
Casino, class 1 resort	Commercial	180	4.32
Neighborhood shopping Center	Commercial	132	3.14
Motels	Commercial	90	2.16
Total		1,033	24.75

Crime at Place Over Time

Findings demonstrate that crime concentrates at specific micro-locations in Las Vegas. Because class 1 resorts and low-rise apartments emerged as the top two proprietary places with the greatest frequency of crimes against property and persons, further exploration of the stability of crime over time is warranted. If crime remains stable over time, this suggests that there may be specific environmental conditions contributing to this phenomenon. If crime does not remain stable (per year) over the three-year timeframe, these concentrations may be due to random variation (Eck et al., 2007). Using crime data from 2018, 2019, and 2020, I explore whether these crime rates change over a three-year timeframe at (a) class 1 resorts that experience crime against property and (b) multi- residential units that experience crimes against persons. I used a growth model analysis with a time invariant variable (land use) to address this question. Growth models are commonly used in criminology to examine trajectories of offending group behavior (Nocentini et al., 2012) and crime at place (Hipp & Kane, 2017). The purpose of a growth model is to detect differences or changes over time. For

the purposes of this analysis, growth curves represent differences in crime at a specific land use (class 1 resorts and multi-residential lots) over three years.

To prepare the data, 2018, 2019, and 2020 crime data were exported from ArcGIS Pro into Excel. All crimes that were mapped to land use codes for class 1 resorts and multi-residential units were identified and exported into another table by corresponding year. Each year was imported into SPSS, where addresses were aggregated to identify duplicates. The number of duplicate addresses served as the number of crimes at that address. For instance, if address 1234 Smith Street appeared 52 times, then that address experienced 52 crimes. Once duplicates were identified, all crimes for that property were merged to one address based on the year the crime occurred. After each year was sorted and cleaned, all three years of data were merged into one file by the following variables: Id, Land use (0, class 1 resorts; 1, multi-residential), Year 1 (Y1), Year 2 (Y2), and Year 3 (Y3) (Table 5.10). Again, duplicate addresses were identified and aggregated to the appropriate group by year. To conduct the growth curve analysis, data were imported into Mplus.

Table 5.10 (and Figure 5.7) shows results of the growth curve model with the one-time invariant variable, land use. The introduction of land use into the model shows that the average (or mean) amount of crime between class 1 resorts and multi-residential land use is statistically significant (b= 1.043, p=.026). However, land use classification was not found to have a significant influence on crime at place over time (p>.05). This means that while the type of land use is found to have an impact on the average amount of crime in location, it does not predict the variations in crime over time within each place. In other words, the fact that crime increased at a location over three years was not likely due to land use- variance over time is

better explained by other factors. Each of the time varying variables, 2018 (Y1), 2019 (Y2), and 2020 (Y3), was found to be statistically significant (p<.001). This indicates that crime varies over time by location.

Additionally, Akaike's information criterion (AIC- 43259.987) and Bayesian information criterion (BIC- 43317.634) indices demonstrate a good model fit for the data, with related fit statistics of SRMR= 0.013 and CFI = 0.998 (Table 5.11). The chi-square value was not found to be statistically significant (p>.05). SRMR (standard root mean residual) is an absolute fit statistic of the standardized difference between the observed and hypothesized covariance of the data. Values of .00 indicate an exact model fit, values <0.05 indicate a close model fit, and 0.05 to 0.08 indicate an acceptable model fit, while values greater than .08 suggest a poor model fit (Finch & Bolin, 2017). CFI is a relative fit statistic, or comparative fit index used in Mplus. A value of 1 indicates an exact fit, .95 to 0.99 indicate a close fit, and .90 to .95 indicate an acceptable fit.

Table 5.10 Growth Curve Modeling Analysis of Crimes at Class 1 Resorts and Multi- Residential Units 2018, 2019, and 2020

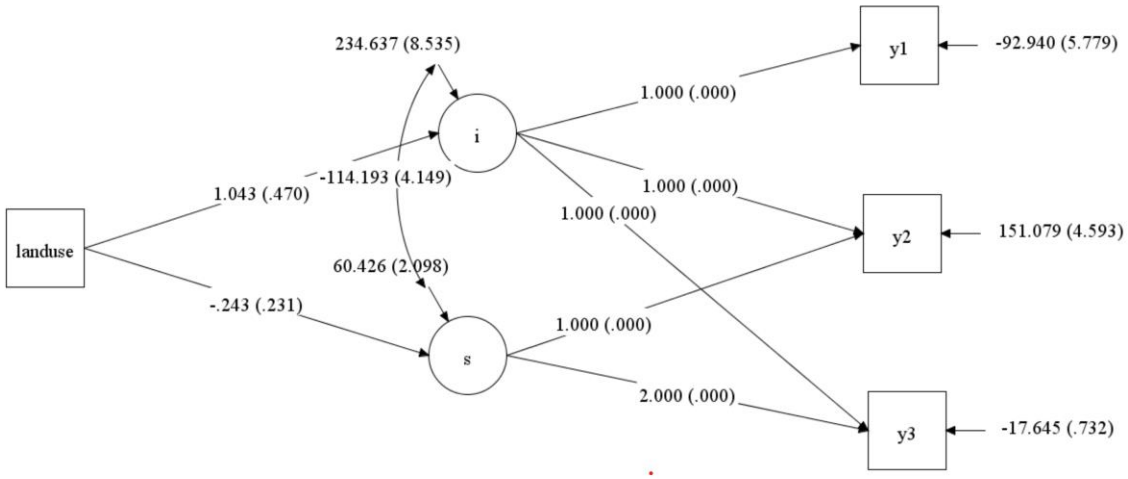
	Estimate	S.E.
Time Invariant Variable		
Intercept on	1.043*	0.470
Average amount of crime at place		
Slope on	-0.243	0.231
Change in crime at place over time		
Time Varying Variable		
Crime at place in 2018	-92.940***	5.779
Crime at place in 2019	151.079***	4.593
Crime at place in 2020	-17.645***	0.732

*p<.05, ***p<.001

Table 5.11 Model Fit Indices

Information Criteria	Value
Akaike (AIC)	43259.987
Bayesian (BIC)	43317.634
Chi-Square	0.157
Adjusted Bayesian (ABIC)	43285.862
Comparative Fit Index (CFI)	0.998
Standardized Root Mean Residual (SRMR)	0.013

Figure 5.7 Diagram of Growth Model Analysis for Crimes at Class 1 Resorts and Multi-Residential Units 2018, 2019, and 2020



To visualize these differences, data is plotted in Figures 5.8 and 5.9. Individual differences are represented by different points at time 0. While most locations experience

stable crime trends over time, we can see that some properties experienced a fluctuation in these trends. A clear spike in crime occurred at several multi-residential properties during 2019, although most properties (both class 1 resorts and multi-residential) either remained stable or experienced a decrease in crime. Moreover, figure 5.9 depicts the trajectory of crime for the estimated individual differences between class 1 resorts and multi-residential land use. The estimated individual difference of crime at class 1 resorts remains fairly stable over the three-year timeframe. However, crime at multi-residential properties depicts a decrease over the same timeframe.

Figure 5.8 Observed Differences Across Individual Properties: Crimes at Class 1 Resorts and Multi- Residential Units 2018, 2019, and 2020

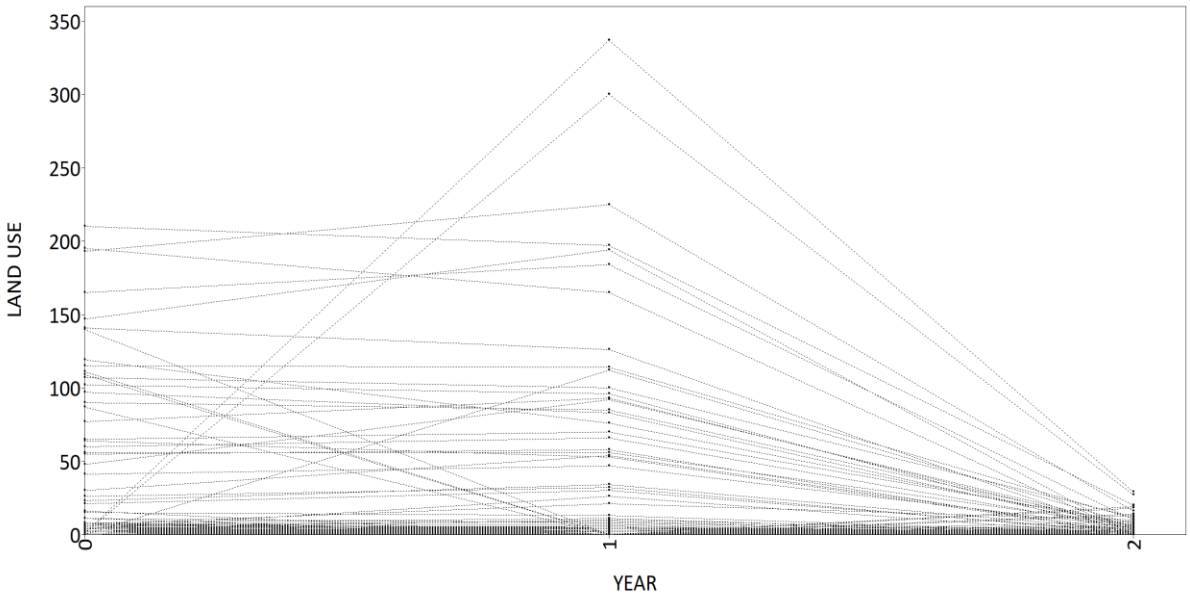
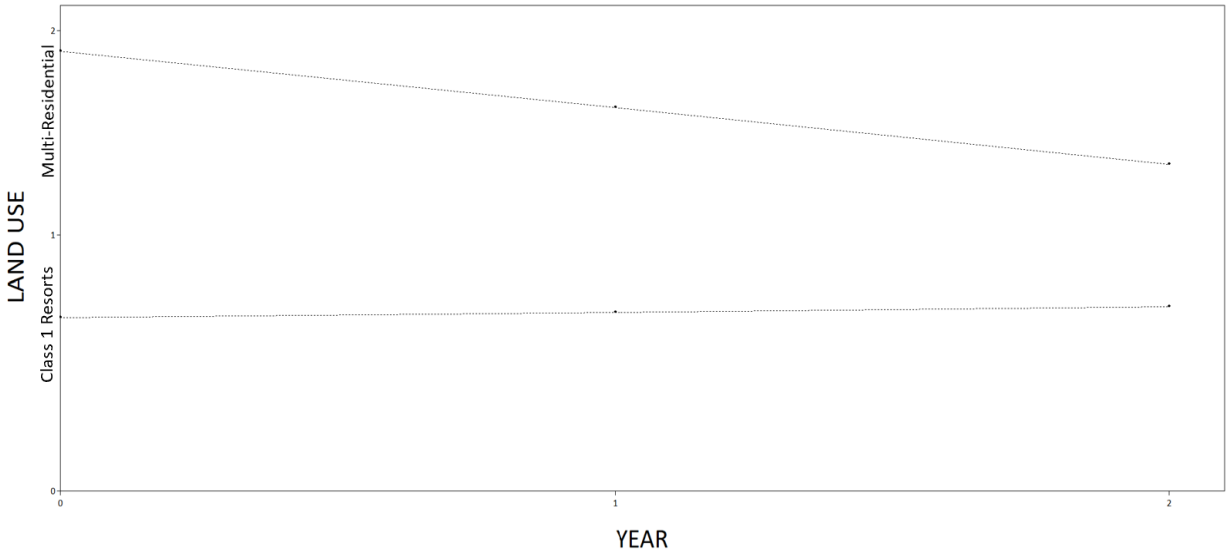


Figure 5.9 Estimated Individual Differences, Crimes at Class 1 Resorts and Multi- Residential Units 2018, 2019, and 2020

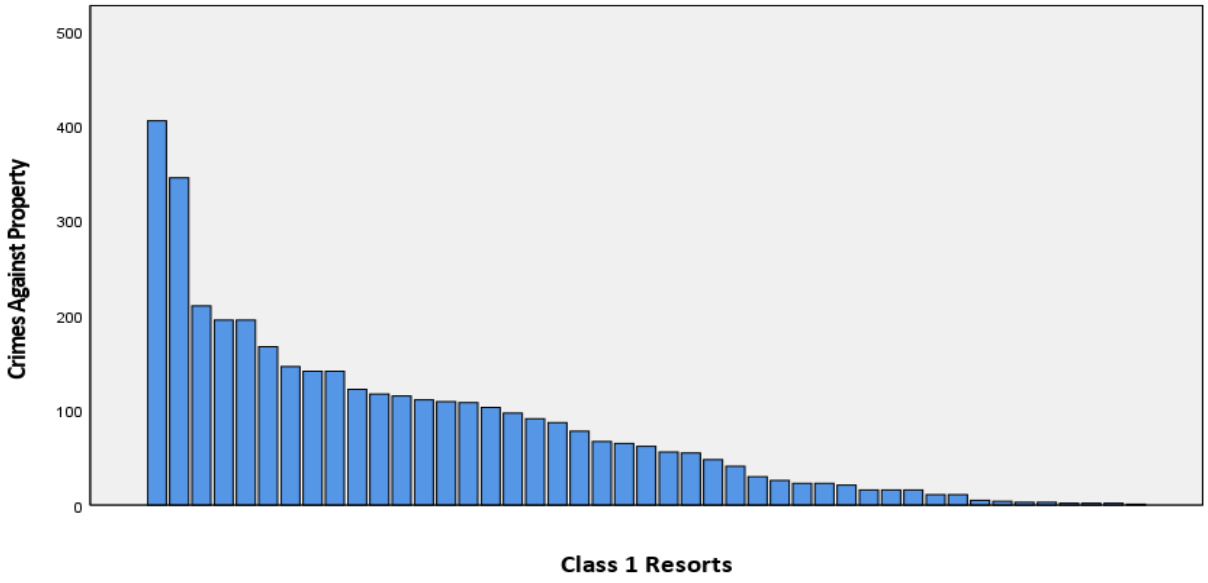


Risky Facilities

Findings from the micro-level analysis raised a question as to whether specific class 1 resorts and low-rise apartments are "riskier" than others. Put another way, does a small proportion of the group account for the majority of crime within groups of similar facilities? To answer this question, all class 1 resorts that experienced crimes against property and multi-residential lots that experienced crimes against persons were exported into a separate table. All facilities were rank ordered from the most amount of crime to the least amount of crime, separated by class 1 resorts and low-rise apartment complexes in Las Vegas. Both distributions reveal the expected J-curve, which is depicted in Figures 5.10 and 5.11.

Figure 5.10 shows the distribution of crimes against property for class 1 resorts ranked highest to lowest. This analysis only includes crimes against property because class 1 resorts were found to experience greater property crimes, whereas multi-residential properties experienced greater violent crimes. The J-curve distribution for class 1 resorts reveals that for all 45 class 1 resorts in this study, few facilities on the left end of the distribution experience many crimes against property. Specifically, 4.4% of class 1 resorts account for 14% of crimes against property. In other words, a small number of these homogenous facilities (class 1 resorts) accounts for most of the crimes against property. This concentration is consistent with the 80/20 rule; a small proportion of these facilities is responsible for most of the crime against property (Eck et al., 2007).

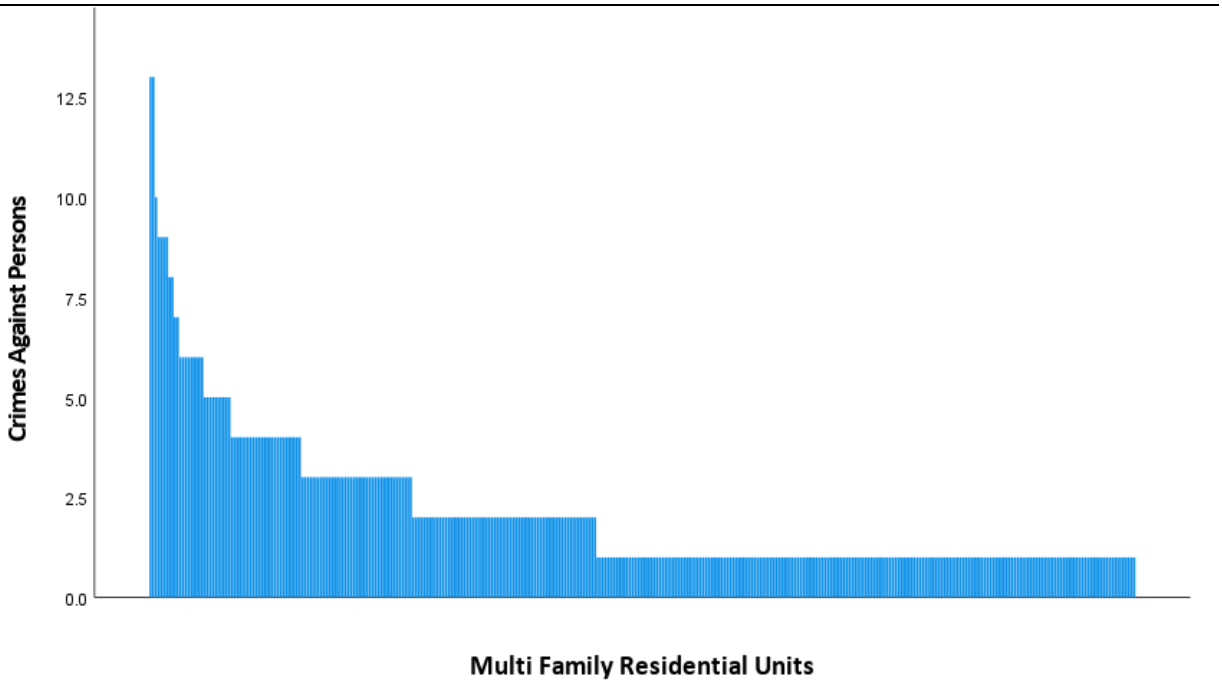
Figure 5.10 All Class 1 Resorts in Las Vegas



*Graph represents 45 properties.

Figure 5.11 shows the distribution of crimes against persons at multi-residential units (five or more units and one to three stories high) ranked highest to lowest. The J-curve distribution for multi-residential units reveals that for all 364 units in this study, few facilities on the left end of the distribution experience many property crimes. Specifically, 5.5% of multi-residential units account for 20% of crimes against persons. In other words, a small number of these homogenous facilities account for a disproportionate number of crimes against persons in Las Vegas. Again, the J-curve distribution reveals that few facilities on the left end of the distribution experience a significant amount of crimes against persons. This concentration is consistent with 80/20 rule.

Figure 5.11 All Multi- Residential Lots with Five or More Units in Las Vegas



*Graph represents 361 properties.

Summary

This study provides an exploratory examination of crime concentrations and land use at a variety of spatial levels in Las Vegas, Nevada. This study replicates and extends Wuschke and Kinney's (2018) research on the built environment, land use, and crime to explore local connections between land use in a large urban environment and two crime categories: property crimes and crimes against persons. To help inform future research and policy, the significance of these findings is reiterated and briefly discussed. This summary begins with findings related to the macro-level analysis followed by findings associated with each of the subsequent land use analyses.

Macro-Level Findings. Land use has clear implications for the likelihood of being associated with higher concentrations of crime and is apparent across the variety of spatial levels. At the macro-level, the vast majority of parcels in LVMPD's jurisdiction are single family residential lots (n= 411,415), similar to Wuschke and Kinney's (2018) study, but these lots experience a low rate of crimes against property in comparison to Transportation, Communication, and Utilities lots (TCU). Whereas residential lots experienced greater rates of crime in Wuschke and Kinney's (2018) study, TCU lots in Las Vegas are associated with a greater rate of crimes against property per address when compared to single family residential lots. This may be attributed to Las Vegas being a major tourist attraction with an influx of 4.2 million visitors per year.

Some differences exist in the spatial patterning of crimes against persons according to land use at the broader aggregate level of Las Vegas. The highest rates of crime are found on TCU, industrial, and commercial lots. However, when examining the spatial distribution of these crimes, some interesting findings emerge. The spatial distribution of property crimes and crimes against persons on CIR land use differ, but some similarities are found when examining the distribution of crimes against persons on multi-residential and CIR lots meaning that distinct spatial crime patterns appear to concentrate near the same type of properties. Without further investigation, it would be assumed that all TCU lots are criminogenic. These findings demonstrate the need to explore concentrations within specific land use categories.

Meso-Level Findings. Evidence from the spatial clustering prompted further questions about property crime and violent crime distributions at the meso-level of analysis, or within subgroups of facilities. Evidence continued to demonstrate a disproportionate concentration of crime for specific types of land use within the broader land use context. Within the TCU

category, transportation land use experiences the greatest rate of crimes against property. These are interesting findings because the Harry Reid International Airport (formerly Las Vegas international Airport) revealed the highest concentration of property crime. Recently, airports have been the topic of study as risky facilities for crime (Natarajan, 2021). Often overlooked in academic scholarship, airports draw a disproportionate number of visitors—whether they are just passing through or reaching a final destination—placing a substantial number of potential targets in close proximity to motivated offenders, thus making them hot spots for crimes (Stucky & Osterman, 2009). It is important to note that there are very limited transportation parcels in Las Vegas. With the sheer volume of people they draw, it is no surprise that they would stand out as either a crime generator or crime attractor.

In the original study, commercial properties experienced greater rates of crime, specifically at regional shopping centers. In Las Vegas, within the commercial land use category, class 1 resorts experience the greatest rates of crime against property. Like airports, class 1 resorts have bars, restaurants, retail outlets, and converging spaces that may warrant within parcel analysis. However, that is beyond the scope of this investigation. A detailed analysis of property crime on CIR land use also emphasizes the need to examine within group variation. While special purpose and nursing homes have minimal property crimes, parks are associated with greater counts and rates of property crimes in Las Vegas. In Wuschke and Kinney's (2018) study, they found schools experienced greater property crimes.

As for crimes against persons, the detailed analysis revealed that retail shopping stores experience higher rates of violent crime than neighborhood shopping centers. Very few murders and sexual assaults occur on this type of land use, but they do occur. These findings

need careful analysis. Because all retail facilities were grouped to one address (instead of individual units), this may wash out a specific type of leased retail space that generate or attracts more crime.

Micro-Level Findings. Within Las Vegas, the frequency of property crime and crimes against person concentrate at commercial and residential units, whereas both types of crimes occurred on commercial lots in the original study. When we explore these specific subcategories, class 1 resorts report higher frequencies of property crime and low-rise apartments report the greatest frequency of violent crime. Las Vegas land use is predominantly residential, similar to Coquitlam, yet commercial land use dominates the list of categories that experience property crimes, specifically class 1 resorts. These locations fit the description of a crime generator in that they provide a variety of targets, such as individuals, stores, items, and parking garages.

While class 1 resorts generate more property crime, multi-residential units attract more violent crime, differing from the original study. Because of the volume of people in one location, motivated offenders and targets can be in close proximity on a regular basis (Stucky & Osterman, 2009). In addition, these crime trends fluctuate over a three-year timeframe. Finally, when exploring sets of homogeneous facilities, several within group facilities produced the most amount of crime, confirming the presence of the “iron law of troublesome places” (Eck et al., 2007) in Las Vegas.

CHAPTER 6

CONCLUSION

Our physical environment has a profound effect on crime. Land use shapes how we move within urban spaces and shapes conditions necessary for crime to occur by placing motivated offenders and suitable targets together in time and space. This study has highlighted the concentrations of crime associated with specific land use within Las Vegas, Nevada at various spatial levels. To examine concentration of crime by land use, three research questions were explored. The research questions examined (a) the top land use types and subtypes associated with higher rates of property crimes and crimes against persons; (b) crime concentrations at specific land use subtypes, and specific addresses over a three-year timeframe; and (c) whether a small group of similar facilities account for a majority of crime at a place. This chapter begins with a discussion of the overall findings of this study. The discussion interprets the findings of this study and concludes by discussing the importance of studying specific land uses when it comes to crime concentrations. The strengths and limitations of this study, as well as the implications of these findings for public policy and policing, are also discussed. This chapter concludes with final thoughts on the significance of the current study.

Discussion

This study highlights the concentrations of crime at specific land use categories within Las Vegas. It is one of the very few studies that seeks to address crime concentrations across broad land use categories and within specific land use subtypes rather than via street segments. Crime concentrations at the macro-, meso-, and micro-level of analysis has been examined since the 1800's (Brantingham & Brantingham, 1993; Burgess, 1915; Cohen & Felson, 1979;

Glide, 1856; Guerry, 1883, 1864; Jacobs, 1961; Jeffery, 1971; Mayhew, 1865; Newman, 1972; Shaw & McKay, 1942; Sherman et al., 1989; Weisburd et al., 1992, 2004). Yet, most research on land use and crime rarely focuses on specific land use types, except for a few (see Roneck & Pravatiner, 1989; Roneck & Lobosco, 1983; Sampson & Raudenbush, 2001). Herein lies the importance of this study. Very little research has been conducted on varieties of land use at varying spatial scales that examine both property and violent crimes. Even less research has obtained land use data to match crime addresses to specific county land use codes. Assigning crimes to parcels allows for a more refined picture of crime at a place. This study begins to fill that gap.

Findings from this study will be discussed in relation to each question. This dissertation began by exploring the top land use types and subtypes are associated with higher rates of property crimes and crimes against person in Las Vegas. Land use designations play an important role in determining when, how, and by whom a location is used. While the vast majority of Las Vegas is zoned for residential land use, the top land use types associated with higher rates of property crimes are Commercial, TCU, and Industrial. As discussed in chapter 3, Las Vegas commercial properties draw a greater concentration of people as they are high activity nodes within the daily routine activity patterns of both residents and tourists. However, examining crime at commercial land use from a macro prospective only informs research that groups of places are problematic. This finding does not allow researchers to distinguish which places may be more problematic. When we examine commercial properties from the within category, class 1 resorts, emerges as having a higher rate of property crimes.

Class 1 resorts are large multiuse facilities that contain bars, restaurants, retail outlets, a casino floor, and converging spaces that provide ample opportunity for crime when a motivated offender and suitable target converge without capable guardianship. Class 1 resorts lease most of their retail space to generate more revenue. This means that each retail outlet is privately owned and operated. Because research indicates that crime concentrates, further investigation of where crimes occur within these spaces can lead to target hardening measures for specific outlets, where place managers have more control of the environment. Since such interventions can be costly, investigating temporal patterns is also recommended. Exploring temporal changes in crime rates will allow class 1 resort owners to identify not only where, but also when they need more guardianship.

TCU land use also experiences a high rate of property crimes. Again, from a macro perspective, we cannot distinguish which type of TCU land use generates or radiates more crime. However, when we explore the within group variation, transportation land use experiences the highest rate of property crime. The Las Vegas economy relies heavily on the tourism industry, and transportation hubs see an influx of 45 million visitors annually who converge in these facilities. Large multiuse facilities, such as airports, place a substantial number of potential victims in close proximity to motivated offenders. Transportation hubs, like the one depicted in Figure 5.1, show a clear crime concentration at Harry Reid International airport (formerly McCarran International Airport). This has interesting implications for the Las Vegas tourism industry. If visitors are victimized upon arriving or departing Las Vegas, they may never return. Moreover, if their stay in a class 1 resort also results in victimization, Las Vegas may be dubbed “Sin City” for a whole new host of reasons.

Large facilities, such as the airport, are similar in nature to class 1 resorts in that they also have multiple retail outlets and bars owned and operated by private entities. Natarajan (2021) has noted that 90% of the workforce at an airport are contracted by private companies, whereas the other 10% work directly for the airport in a variety of support positions. These numbers have implications for hiring practices and place management within the airport.

Interestingly, high rates of property crime also occur on industrial land use. But again, we cannot differentiate which specific within land use category may be more problematic at the meso-level of analysis. Upon exploring within group variation, storage facilities emerged as experiencing a higher rate of property crimes. Research on industrial land use and crime is virtually nonexistent, making this an important point of study, particularly for securing buildings that may have limited guardianship. However, these findings should be interpreted carefully. Because there are so few industrial land use lots, a small amount of crime will make this land use appear to be "risky" when, in fact, it may not be. In addition, because fewer people frequent these locations, there is less opportunity for a motivated offender to engage in violent crime. Therefore, it is not unusual that industrial lots would experience a greater concentration of property crime due to inadequate guardianship. More research should be conducted to explore the environmental characteristics that may be contributing to these locations. For instance, it would be beneficial to know if the storage facility is indoor and climate cooled or if it is outside with fencing. Having knowledge of such characteristics can help with the development of situational crime prevention measures.

The top land use types that emerged with higher rates of crimes against persons are CIR, commercial, and multi-residential land use. CIR land use serves many purposes, some of which

are hospitals and parks. However, examining crime rates at a macro-level of analysis does not give a clear representation of the specific CIR parcels that may be generating or radiating more crime. The within group variation for CIR land use shows that crimes against persons are highly concentrated at public use parks. This falls in line with current research on parks as crime generators (Groff & McCord, 2012; Wilcox et al., 2004). Parks have distinct edges— a change from one type of urban space to another—which experience high crime rates in part because they mark areas of potential conflict where strangers may not be easily accepted or go unnoticed (Brantingham & Brantingham, 1975, 1978b). More than half of all reported crimes at parks involve motor vehicle larceny. This finding has important implications for the design and maintenance of parking lots.

In addition to experiencing higher rates of property crime, commercial land use also experiences higher rates of violent crime. Within group variation shows that violent crime concentrates at restaurants and cocktail lounges. This study contributes to the extensive research on bars and violence. While bars are popular activity nodes that range in size and function (e.g., drinking, dining, dancing), they bring together diverse personalities with all manner of cultural differences, consuming alcohol, and creating a potentiality for arguments that can escalate to violence. Some bars draw specific people because of known criminal opportunity, fueling violence in and around the physical location (Franquez et al., 2013; Madensen & Eck, 2008; Ratcliffe, 2012; Roneck & Bell, 1981; Roneck & Maier, 2008; Spicer et al., 2012). When there is a lack of capable guardianship at popular activity nodes, motivated offenders will seize an opportunity to engage in crime.

Multi-residential units also experienced higher rates of violent crime. While macro-level analysis suggests that all multi- residential units may be problematic, within group analysis suggests otherwise. Multi-residential land use with five or more units (one to three stories) emerged as having the greatest crime concentration per lot. These units allow for a considerable number of suitable targets and motivated offenders to converge at an activity node. There is a significant amount of research on violent crime at multi-residential units (Haberman et al., 2013; McNulty & Holloway, 2000; Park & Lee, 2019;). However, research indicates that violent acts committed on these properties are usually between the residents who live there (Suback et al., 2018). In some cases, neighbor disputes lead to violent outbursts (Felson & Steadman, 1983). In other cases, the violence is attributed to neighborhood disadvantage (McNulty & Holloway, 2000). While these and other environmental condition may contribute to place based violence, improper place management also may play a role.

Crime is rare (Kinney et al., 2008), but when it does occur it does not concentrate uniformly. The concentrations identified at the meso-level warranted further investigation to identify if this phenomenon occurs at specific addresses. As such, land use for both property crimes and crimes against person were explored to identify the single address that generates or radiates more crime. The commercial property that experiences the greatest frequency of property crime is a class 1 resort located in the heart of Las Vegas. It is no secret that the tourism industry drives the Las Vegas economy. Resident and visitors alike enjoy their time in casinos and all of the amenities that class 1 resorts have to offer. However, when one resort is using more police resources that the others, it may be time to reevaluate situational crime

prevention measures and property management practices. As I will discuss in the next section, not all class 1 resorts have such a high concentration of crime.

The address that emerged as having the highest frequency of crimes against persons is a multi-residential unit. This multi-residential unit is comprised of 18 buildings and just over 900 rooms near the heart of Las Vegas. When guardianship or informal social control mechanisms are absent, violent crime has the potential to take over specific places. These are important findings for place managers and police. If specific low-rise apartments remain problematic over any length of time, place management should reevaluate their practices and their situational control measures. For police, when one property remains problematic for any length of time, they may be dealing with a network of offenders who have become embedded within the location and networked into a series of nearby places. Targeted investigations and policing strategies could help assist in dissolving the violent crime network.

Research indicates that crime remains stable over time (Andresen & Malleson, 2011; Weisburd 2015; Weisburd & Amram, 2014). This hypothesis was tested using data from 2018, 2019, and 2020. Results revealed that most locations remained stable over the three-year timeframe. However, a few multi-residential places saw some fluctuation in crime. Past research exploring crime trajectories typically include a longer timeframe. This is one of the limitations to this study. Using data over a 10-year timeframe may reveal different results.

Empirical evidence demonstrates that within groups of similar facilities (e.g., bars, apartments, hotels), a small proportion of the group accounts for most of the crime experienced by the entire group (Eck et al., 2007). This phenomenon forms a J-curve in a bar

graph, confirming crime concentrations at a small proportion of homogenous facilities. Las Vegas is no exception to this rule.

All class 1 resorts and multi-residential lots that experienced crime was rank ordered from greatest to least amount of crime. For class 1 resorts, results demonstrate 4.4% class 1 resorts account for 14% of crimes against property, confirming the "iron law of troublesome places" in Las Vegas. One particular resort has over 3,500 guest rooms, 22 restaurants, 10 bars and lounges, and over 150 high end retail stores. The casino portion of the resort consists of over 150 table games, over 1300 slot machines, and 18 sportsbook screens. The other class 1 resort has over 6500 guest rooms and 12 restaurants and bars. Its casino floor holds over 2500 slot machines, over 130 poker and table games, and 21 retail outlets. Both locations create target rich environments with substantial opportunity for motivated offenders. One particular address within multi-residential lots experienced the most crime within the group emerging as a risky facility. This location is relatively close to the resort corridor and may be creating a "spillover" effect of violent crime (McNulty & Holloway, 2000). By separating out the type of class 1 resort and multi-residential units, crime prevention specialists can target the issues contributing to crime in these locations to improve conditions.

Eck et al. (2007) suggest that several different characteristics of places may contribute to crime concentration including random variation, the reporting processes, targets, offenders, and place management. In line with Eck's (1994) contribution to routine activity theory, motivated offenders capitalize on criminal opportunity when places are unprotected by managers, particularly if the place is known to have suitable targets. Offenders make choices about places based on environmental cues developed through their routine activities. As such,

some facilities may draw more crime based on specific characteristics, such as the lack of capable guardianship and improper place management. It is also important to note, though, that crimes against persons appear to concentrate heavily where there is a greater number of targets. This may mean that these locations either lack capable guardianship, proper place management, or motivated offenders lack handlers. As for property crimes, greater concentrations appear where there are less people, such as industrial land use, suggesting a lack of guardianship.

While the impact of crime on diverse types of businesses suggests that the risks are not evenly distributed (Eck et al., 2007; Fisher & Looye, 2000), differentiating risky facilities from broad hot spots leads to focused crime prevention measures and greater community partnerships with the police (Eck et al., 2007). Because we know that crime is both rare and not distributed evenly (Sherman et al., 1989), police can focus their resources on risky facilities.

Current Study: Strengths and Limitations

The primary contribution of the present study is that it is the first to explore concentrations of property crime and violent crime at various levels of analysis in a major tourist destination: Las Vegas. All of the research conducted on crime at place occur in locations much different from a place that promotes itself as "Sin City." This study confirms that even in "Sin City" where last call is nonexistent, the laws of crime concentrations (Weisburd, 2014) and troublesome places (Eck et al., 2007) apply. What happens in Vegas is not unique to Vegas.

Although the use of spatial analysis to examine crime data has gained attention, notable limitations about police data and spatial analysis should be acknowledged. It is well known that police data can be incomplete or inaccurate. Any record that did not match to a parcel address

was excluded from the study, thus limiting the number of crimes at places to be examined. These omissions may have skewed results, either making some places appear to be "riskier" than they are or making "risky places" appear to be less risky.

Research also has shown that geocoding algorithms can be inaccurate. Geocoded events can fall into incorrect spatial locations (Andresen et al., 2020; Ratcliffe, 2001). In other cases, street locations are just never found (Chainey & Ratcliffe, 2005) because of spelling errors, incorrect street type abbreviations, and missing information. These inaccuracies can lead to a bias in spatial patterns that misrepresent places. However, Cayo and Talbot (2003) found that geocoding to the parcel--as I have done in this study--rather than to the street segment provides greater spatial accuracy.

Researchers have conceded that a limited amount of data can be missing before spatial patterns are not considered acceptable science (Andresen et al., 2020). Ratcliffe (2004) identified a 78% match rate as acceptable, whereas Andresen et al. (2020) suggested 85% as the gold standard of an acceptable match rate. However, Zandbergen (2007) has argued that geocoded match rates vary by location. In a comparison of three counties using seven types of land use, Zandbergen (2007) found that average match rates for an address, street centerline, and parcel are 73%, 83%, and 60%, respectively. As such, "geocoding quality is very much a function of the quality of local reference data" (Zandbergen, 2007, p. 231). Despite the lack of consensus, and due to the common understanding that police data contain errors, this study achieved a 99% match rate, after excluding incidents documented outside of LVMPD's jurisdiction, any offense that did not have an address (intersection, or unknown), any offense

that occurred at a police station area command or detention center, and land use classified as vacant or mines.

In addition to the methodological limitations, a few more should be discussed. This study mainly focuses on rates of crime per lot, not the overall frequency of crime at places. Additionally, when crime is aggregated by property crimes and violent crimes, applying situational crime preventing measures cannot be crime specific. Further evaluation of nonaggregate crimes at place may be more helpful to crime prevention specialists.

There are also notable limitations with using a three-year timeframe to assess temporal changes in crime trends. While three years is an acceptable range for crime and urban development (Matijosaitiene et al., 2019), and may be able to detect changes in places where populations change quickly (i.e., tourist destinations like such as “the strip” in Las Vegas), this may not detect changes in crime patterns in residential locations. Because homeowners tend to remain in one location for an average of 13.3 years (Rohe et al., 2002), a 15-year timeframe is recommended.

This study also did not control for socioeconomic, demographic, or other variables previously found to be correlated with crime patterns. Research suggests that the proximity to disadvantaged neighborhoods may place potential victims in close proximity to motivated offenders, thus increasing crime (Sampson & Lauritsen, 1990). Evidence also suggests that physical disorder and poverty may be strongly related to increases in crime trends (Weisburd et al., 2012). Further research should consider introducing these variables to explore this relationship.

Implications

This research highlights the concentration of crime at various levels of analysis. This study's findings suggest that the places tourist frequent the most (e.g.., the airport and resorts) place them at greater risk for victimization. Place managers should consider identifying crime hot spots within high crime proprietary places in order to address the specific needs of the facility. This may relate to hiring practices, situational crime prevention measures, or relocation of shops, bars, and restaurants. Place managers have a considerable amount of control over locations and should consider working with crime prevention specialists. Interestingly, aggravated assaults occur at storage facilities. Unfortunately the data does not differentiate if these storage facilities are indoors, well, lit, and temperature controlled, or if they are outside. Crimes against persons also appeared to be highly concentrated at multi-residential low-rise apartments (one to three story). The top two most common crimes that occur at multi-residential low-rise apartments are aggravated assault and sexual assault. However, these findings need careful interpretation. Multi-residential land use was merged to one address, even though there may be a substantial number of individual units. This approach may over emphasize the amount of crime at this specific land use.

Moreover, identifying specific proprietary places with disproportionate levels of crime in Las Vegas has implications for place management and directed police resources. As previously stated, whether an owner or management company, place managers have considerable control over their locations. There can be several reasons why a place becomes criminogenic. First, owners may not be aware of the conditions contributing to violence. This implies that they may need proper training on how to run crime free housing. Working with crime scientists or crime

prevention specialists is advised in this case. Second, they may be ignoring the conditions conducive to crime. If they are ignoring the conditions contributing to violence, they should be held culpable through criminal statutes for endangering the lives of residents. At this time, only civil statutes are available to hold place and property managers accountable. Third, they may have a property management company that is not reporting issues either for financial reasons or sheer negligence. If the lack of reporting to ownership is due to financial constraints, then the company should be reevaluate for effectiveness and alternative measures should be devised. However, if the place management company is not reporting to the place owners out of sheer negligence, they too should be held criminally liable for endangering the safety of the community.

There are further implications for police agencies and officers. Because we know that crime concentrates at specific addresses (and typically for long periods of time), police agencies should consider directing their resources to these locations. In order to identify place hot spots, agencies should consider consulting with crime scientists or embed them within their agency. This can help with (a) safeguarding against missing and incomplete data (b) understanding the value of the data they collect, and (c) assist in training police in different methods to disrupt crime places. Police should also consider establishing relationships with place managers to help them vet property managers based on risk assessment tools.

Directions for Future Research

This study's findings and limitations offer guidance for future research. First, future research may examine the distribution of crime within large, multi-use facilities. Specifically,

where crime concentrates within the facility. Because crime concentrates, we may find that some locations within multiuse facilities may be more criminogenic than others.

Second, future research may also examine industrial land use, in particular storage facilities that are susceptible to high rates of crime. This study does not differentiate between types of storage facilities. A comparative examination of differing storage facilities-built environment may lead to greater insight as to what conditions may be contributing to crime.

Third, future research should explore land use using individual categories and a specific crime index. This will help to expand the fields understanding of micro locations and conditions contributing to crime at place. These studies should also include a longer timeframe to explore the stability of crime concentration over time.

Fourth, a risk assessment for property owners and place managers should be developed. When considering the role of place managers, a typology can be identified to assist in the development of a risk assessment used by licensing boards when issuing permits to operate a business. The risk assessment can aid in identify new place managers who may need training on how to operate a crime free business. It may also aid in identifying place managers who may be perpetuating violent hotspots and need continued training on owning a crime free place. These regulatory efforts may be an effective strategy to prevent, minimize, or eliminate crime at place.

Final Thoughts

This study represents the first attempt to identify concentrations of crime associated with specific land use within Las Vegas, Nevada at a variety of spatial levels. This study identified (a) the top land use types and subtypes associated with higher rates of property

crimes and crimes against persons; (b) crime concentrations at specific addresses, and over a three-year timeframe; and (c) whether a small group of similar facilities account for a majority of crime at a place. Using ArcGIS Pro, land use data provided by the Clark County's Accessors office was merged with LVMPD crime data to explore these concentrations.

This dissertation provides insight into property crime and violent crime at various levels of spatial analysis. While previous research explores similar crime concentrations in various locations around the world, this is the first study to empirically assess this concentration in a tourist destination with 24-hour access to alcohol and gambling. As such, this dissertation provides a preliminary framework to further evaluate crime at place.

This study found some similarities and differences from the original study. Both locations are predominantly comprised of residential lots, both locations experience disproportionate crimes against property and persons on commercial lots, and both locations experienced crime on CIR lots. However, Las Vegas experienced greater rates of property crime on TCU lots and class 1 resorts (commercial), both target rich environments. Additionally, Las Vegas experiences greater crimes against persons on multi-residential lots. By adding the extension to the original study, crime was found to concentrates over time and within homogeneous sets of facilities.

One of the more interesting findings from this study is that a small town like Coquitlam, Vancouver, Canada is very much like the large tourist destination of Las Vegas. As Gottdiener et al. (1999) suggest, the rest of the country is becoming more like Las Vegas (Wysong, 2001). Yet, Las Vegas is becoming more like the typical city as the urban landscape changes with master

planned communities and political and economic development. This study offers further evidence of such findings.

The results from this study can be useful for exploring the relationship between land use and crime to inform policy (policy on specific facilities/businesses/place management practices/risk assessments) and police practices (policing places, addressing situational crime prevention). While crime is rare, the consequences associated with it, and improper place management, can be devastating for the surrounding community. As such, it is essential that future research continue to explore the impact of the built environment and crime, police responses to high crime places, and the impact of place management in mitigating such events.

REFERENCES

Accordino, J., & Johnson, G. T. (2000). Addressing the vacant and abandoned property problem. *Journal of Urban Affairs*, *22*(3), 301–315. https://doi.org/10.1111/0735-2166.00058

Anderson, A. L., & Hughes, L. A. (2009). Exposure to situations conducive to delinquent behavior: The effects of time use, income, and transportation. *Journal of Research in Crime and Delinquency*, *46*(1), 5-34.

Andresen, M. A. (2009). Testing for similarity in area-based spatial patterns: A nonparametric Monte Carlo approach. *Applied Geography*, *29*(3), 333-345.

Andresen, M. A., & Malleson, N. (2011). Testing the stability of crime patterns: Implications for theory and policy. *Journal of Research in Crime and Delinquency*, *48*(1), 58-82.

Andresen, M. A., Curman, A. S., & Linning, S. J. (2017). The trajectories of crime at places: Understanding the patterns of disaggregated crime types. *Journal of quantitative criminology*, *33*(3), 427-449.

Andresen, M. A., Linning, S. J., & Malleson, N. (2017). Crime at places and spatial concentrations: Exploring the spatial stability of property crime in Vancouver BC, 2003–2013. *Journal of quantitative criminology*, *33*(2), 255-275.

Andresen, M. A., Malleson, N., Steenbeek, W., Townsley, M., & Vandeviver, C. (2020). Minimum geocoding match rates: an international study of the impact of data and areal unit sizes. *International Journal of Geographical Information Science*, *34*(7), 1306-1322.

Anselin, L. (1995). Local indicators of spatial association—LISA. *Geographical analysis*, *27*(2), 93-115.

Askey, A. P., Taylor, R., Groff, E., & Fingerhut, A. (2018). Fast Food Restaurants and Convenience Stores: Using Sales Volume to Explain Crime Patterns in Seattle. *Crime and Delinquency*, *64*(14), 1836–1857. https://doi.org/10.1177/0011128717714792

Balbi, A., & Guerry, A.M. (1829). Comparative statistics of the investigation and the number of crimes.

Bernasco, W., & Luykx, F. (2003). Effects of attractiveness, opportunity and accessibility to burglars on residential burglary rates of urban neighborhoods. *Criminology*, *41*(3), 981-1002.

Block, R. L., & Block, C. R. (1995). Space, place and crime: Hot spot areas and hot places of liquor-related crime. *Crime and place*, *4*(2), 145-184.

Braga, A. A., Papachristos, A. V., & Hureau, D. M. (2010). The concentration and stability of gun violence at micro places in Boston, 1980–2008. *Journal of Quantitative Criminology*, *26*(1), 33-53.

Brantingham, P. J., & Brantingham, P. L. (Eds.). (1981). *Environmental criminology* (pp. 27-54). Beverly Hills, CA: Sage Publications.

Brantingham, P. L., & Brantingham, P. J. (1975). Residential burglary and urban form. *Urban studies*, *12*(3), 273-284.

Brantingham, P. L., & Brantingham, P. J. (1981). Notes on the geometry of crime. *Environmental criminology*, *1981*, 27-54.

Brantingham, P. L., & Brantingham, P. J. (1993). Nodes, paths and edges: Considerations on the complexity of crime and the physical environment. *Journal of environmental psychology*, *13*(1), 3-28.

Brantingham, P. L., & Brantingham, P. J. (2017). Environment, routine, and situation: Toward a pattern theory of crime. In *Routine activity and rational choice* (pp. 259-294). Routledge.

Brantingham, P. P., & Brantingham, P. P. (1995). Criminality of place. *European Journal on Criminal Policy and Research*, *3*(3), 5–26. https://doi.org/10.1007/BF02242925

Brantingham, P., & Brantingham, P. (2013). Crime pattern theory. In *Environmental criminology and crime analysis* (pp. 100-116). Willan.

Browning, C. R., Byron, R. A., Calder, C. A., Krivo, L. J., Kwan, M. P., Lee, J. Y., & Peterson, R. D. (2010). Commercial density, residential concentration, and crime: Land use patterns and violence in neighborhood context. *Journal of Research in Crime and Delinquency*, *47*(3), 329–357. https://doi.org/10.1177/0022427810365906

Burgess, E. W. (1928). Residential segregation in American cities. The annals of the American academy of political and social science, 140(1), 105-115.

Carroll, L., & Jackson, P. I. (1983). Inequality, opportunity, and crime rates in central cities. *Criminology*, *21*(2), 178-194.

Cayo, M. R., & Talbot, T. O. (2003). Positional error in automated geocoding of residential addresses. *International journal of health geographics*, *2*(1), 1-12.

Chamard, S. (2010). Routine activities. *The SAGE Handbook of Criminological Theory*, 210.

Clare, J., Fernandez, J., & Morgan, F. (2009). Formal evaluation of the impact of barriers and connectors on residential burglars' macro-level offending location choices. *Australian & New Zealand Journal of Criminology*, *42*(2), 139-158.

Clarke, R. V., & Eck, J. E. (2005). *Crime analysis for problem solvers in 60 small steps*. Washington, DC: US Department of Justice, Office of Community Oriented Policing Services.

Cohen, L. E., & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. *American sociological review*, 588-608.

Cohen, L. E., Cantor, D., & Kluegel, J. R. (1981). Robbery victimization in the United States: An analysis of a nonrandom event. *Social Science Quarterly*, *62*(4), 644.

Corcoran, J., Zahnow, R., Wickes, R., & Hipp, J. (2018). Neighbourhood land use features, collective efficacy and local civic actions. *Urban Studies*, *55*(11), 2372-2390.

Curman, A. S., Andresen, M. A., & Brantingham, P. J. (2015). Crime and place: A longitudinal examination of street segment patterns in Vancouver, BC. *Journal of Quantitative Criminology*, *31*(1), 127-147

Eck, J. E. (1994). *Drug markets and drug places: A case-control study of the spatial structure of illicit drug dealing* (Doctoral dissertation, University of Maryland, College Park).

Eck, J. E., & Madensen, T. D. (2012). Situational crime prevention makes problem-oriented policing work. *The reasoning criminologist: Essays in honour of Ronald V. Clarke*, 80-92.

Eck, J. E., & Weisburd, D. (Eds.). (1995). *Crime and place* (Vol. 4). New York: Criminal Justice Press.

Eck, J. E., Chainey, S., Cameron, J. G., & Leitner, M. (2005). Mapping crime: understanding hot spots, (August). Retrieved from http://eprints.ucl.ac.uk/11291/%5Cnpapers3://publication/uuid/8D145E1D-FFF8-48FB-9E57-3FC90AC3C875

Eck, J. E., Clarke, R. V., & Guerette, R. T. (2007). Risky facilities: Crime concentration in homogeneous sets of establishments and facilities. *Crime prevention studies*, *21*, 225.

Eck, J., & Weisburd, D. (1990). Crime Places in Crime Theory. *American Journal of Sociology*, *95*(6), 1605–1607. https://doi.org/10.1086/229477

Felson, M. (1986). Linking criminal choices, routine activities, informal control, and criminal outcomes. In D. B. Cornish & R. V. Clarke (Eds.), *The reasoning criminal: Rational choice approaches on offending*. New York: Springer-Verlag.

Felson, M. (1995). Those Who Discourage Crime. In J. E. Eck and D. Weisburd (eds.), Crime and Place. Monsey, NY: Criminal Justice Press.

Felson, R. B., & Steadman, H. J. (1983). Situational factors in disputes leading to criminal violence. *Criminology*, *21*(1), 59-74.Glyde, J. (1856). Localities of crime in Suffolk. *Journal of the Statistical Society of London*, *19*(2), 102-106.

Finch, W. H., & Bolin, J. E. (2017). *Multilevel modeling using Mplus*. Chapman and Hall/CRC.

Fisher, B., & Looye, J. W. (2000). Crime and Small Businesses in the Midwest: An Examination of Overlooked Issues in the United States. *Security Journal*, *13*(1), 45–72. https://doi.org/10.1057/palgrave.sj.8340153

Franquez, J. J., Hagala, J., Lim, S., & Bichler, G. (2013). We be drinkin': A study of place management and premise notoriety among risky bars and nightclubs. *W. Criminology Rev.*, *14*, 34.

Frey, B. (2018). *The SAGE encyclopedia of educational research, measurement, and evaluation* (Vols. 1-4). Thousand Oaks, CA: SAGE Publications, Inc. doi: 10.4135/9781506326139

Gottdiener, M., Collins, C., & Dickens, D. R. (2000). *Las Vegas: The social production of an all-American city*. Wiley-Blackwell.

Groff, E. (2011). Exploring "near": Characterizing the spatial extent of drinking place influence on crime. *Australian and New Zealand Journal of Criminology*, *44*(2), 156–179. https://doi.org/10.1177/0004865811405253

Groff, E. R. (2008). Adding the temporal and spatial aspects of routine activities: A further test of routine activity theory. *Security Journal*, *21*(1), 95-116.

Groff, E., & McCord, E. S. (2012). The role of neighborhood parks as crime generators. *Security Journal*, *25*(1), 1–24. https://doi.org/10.1057/sj.2011.1

Guerry, A. M. (1864). Statistique morale de l´ Angleterre comparée avec la statistique morale de la France.

Guerry, A. M. (1883). Essay on the moral statistics of France. *Paris: l'Academie des Sciences*.

Haberman, C. P., Groff, E. R., & Taylor, R. B. (2013). The Variable Impacts of Public Housing Community Proximity on Nearby Street Robberies. *Journal of Research in Crime and Delinquency*, *50*(2), 163–188. https://doi.org/10.1177/0022427811426335

Hammer, M. (2011). Crime places of comfort. *Unpublished Masters Demonstration Project paper. Cincinnati, OH: University of Cincinnati, School of Criminal Justice*.

Hibdon, J., Telep, C. W., & Groff, E. R. (2017). The concentration and stability of drug activity in Seattle, Washington using police and emergency medical services data. *Journal of quantitative criminology*, *33*(3), 497-517.

Hipp, J. R., & Kane, K. (2017). Cities and the larger context: What explains changing levels of crime?. *Journal of criminal justice*, *49*, 32-44.

Hipp, J. R., Wo, J. C., & Kim, Y. A. (2017). Studying neighborhood crime across different macro spatial scales: The case of robbery in 4 cities. *Social science research*, *68*, 15-29.

Jacobs, J. (1961). *The death and life of great American cities*. Vintage.

Jeffery, C. R. (1971). *Crime prevention through environmental design* (Vol. 91). Beverly Hills, CA: Sage Publications.

Kautt, P. M. & Roncek, D. W. (2007). Schools as criminal "hot spots": Primary, 109 secondary, and beyond. Criminal Justice Review, 32(4), 339-357.

Kennedy, L. W., & Forde, D. R. (1990). Routine activities and crime: An analysis of victimization in Canada. *Criminology*, *28*(1), 137-152.

Kinney, J. B., Brantingham, P. L., Wuschke, K., Kirk, M. G., & Brantingham, P. J. (2008). Crime attractors, generators and detractors: Land use and urban crime opportunities. *Built environment*, *34*(1), 62-74.

LaGrange, T. C., & Silverman, R. A. (1999). Low self-control and opportunity: Testing the general theory of crime as an explanation for gender differences in delinquency. *Criminology*, *37*(1), 41–72. https://doi.org/10.1111/j.1745-9125.1999.tb00479.x

Lasley, J. R. (1989). Drinking routines/lifestyles and predatory victimization: A causal analysis. *Justice Quarterly*, *6*(4), 529-542.

Lum, C., Koper, C. S., & Telep, C. W. (2011). The evidence-based policing matrix. *Journal of experimental criminology*, *7*(1), 3-26.

Madensen, T. D. (2007). *Bar management and crime: Toward a dynamic theory of place management and crime hotspots* (Doctoral dissertation, University of Cincinnati).

Madensen, T. D., & Eck, J. E. (2008). Violence in bars: Exploring the impact of place manager decision-making. *Crime Prevention and Community Safety*, *10*(2), 111-125.

Madensen, T. D., & Eck, J. E. (2013). Crime places and place management. In *The Oxford handbook of criminological theory*.

Madero-Hernandez, A., & Fisher, B. S. (2012). Routine activity theory. In *The Oxford handbook of criminological theory*.

Matijosaitiene, I., Zhao, P., Jaume, S., & Gilkey Jr, J. W. (2019). Prediction of hourly effect of land use on crime. *ISPRS international journal of geo-information*, *8*(1), 16.

Mayhew, H. (1865). *London labour and the London poor: the condition and earnings of those that will work, cannot work, and will not work* (Vol. 3). Charles Griffin.

McLaughlin, E., & Newburn, T. (2010). The sage handbook of criminological theory.

McNulty, T. L., & Holloway, S. R. (2000). Race, Crime, and Public Housing in Atlanta: Testing a Conditional Effect Hypothesis. *Social Forces*, *79*(2), 707. https://doi.org/10.2307/2675514

Meier, R. F., & Miethe, T. D. (1993). Understanding theories of criminal victimization. *Crime and justice*, *17*, 459-499.

Messner, S. F., & Blau, J. R. (1987). Routine leisure activities and rates of crime: A macro-level analysis. *Social Forces*, *65*(4), 1035-1052.

Miethe, T. D., & McDowall, D. (1993). Contextual effects in models of criminal victimization. *Social Forces*, *71*(3), 741-759.

Miethe, T. D., & Meier, R. F. (1990). Opportunity, choice, and criminal victimization: A test of a theoretical model. *Journal of research in Crime and Delinquency*, *27*(3), 243-266.

Miethe, T. D., Hughes, M., & McDowall, D. (1991). Social change and crime rates: An evaluation of alternative theoretical approaches. *Social forces*, *70*(1), 165-185.

Miethe, T. D., Stafford, M. C., & Long, J. S. (1987). Social differentiation in criminal victimization: A test of routine activities/lifestyle theories. *American sociological review*, 184-194.

Mustaine, E. E., & Tewksbury, R. (1999). A routine activity theory explanation for women's stalking victimizations. *Violence Against Women*, *5*(1), 43-62.

Natarajan, M. (2021). Airports as Risky Facilities for Crimes.

Newman, O. (1972). *Defensible space* (p. 264). New York: Macmillan.

Nocentini, A., Calamai, G., & Menesini, E. (2012). Codevelopment of delinquent and depressive symptoms across adolescence: Time-invariant and time-varying effects of school and social failure. *Journal of Clinical Child & Adolescent Psychology*, *41*(6), 746-759.

Osgood, D. W., Wilson, J. K., O'malley, P. M., Bachman, J. G., & Johnston, L. D. (1996). Routine activities and individual deviant behavior. *American sociological review*, 635-655.

Park, R. E., & Burgess, E. W. (2019). *The city*. University of Chicago Press.

Park, S. H., & Lee, P. J. (2019). How residents in multifamily housing cope with neighbour noise: The role of attitude towards the neighbours. *Journal of Community Psychology*, *47*(8), 1909-1925.

Ratcliffe, J. H. (2012). The spatial extent of criminogenic places: a changepoint regression of violence around bars. *Geographical Analysis*, *44*(4), 302-320.

Reynald, D., Averdijk, M., Elffers, H., & Bernasco, W. (2008). Do social barriers affect urban crime trips? The effects of ethnic and economic neighbourhood compositions on the flow of crime in The Hague, The Netherlands. *Built environment*, *34*(1), 21-31.

Rice, K. J., & Csmith, W. R. (2002). Socioecological models of automotive theft: Integrating routine activity and social disorganization approaches. *Journal of Research in Crime and Delinquency*, *39*(3), 304-336.

Rohe, W. M., Van Zandt, S., & McCarthy, G. (2002). Home ownership and access to opportunity. *Housing Studies*, *17*(1), 51-61.

Roneck, D. W., & Bell, R. (1981). Bars, blocks and crime. *Journal of Environmental Systems*, *11*(1), 35-47.

Roncek, D. W., & LoBosco, A. (1983). The effect of high schools on crime in their neighborhoods. *Social Science Quarterly*, *64*(3), 598.

Roncek, D. W., & Pravatiner, M. A. (1989). Additional evidence that taverns enhance nearby crime. *Sociology and Social Research*, *73*(4), 185-188.

Sampson, R. J., & Lauritsen, J. L. (1990). Deviant lifestyles, proximity to crime, and the offender-victim link in personal violence. *Journal of research in crime and delinquency*, *27*(2), 110-139.

Sampson, R. J., & Raudenbush, S. W. (2001). *Disorder in urban neighborhoods: Does it lead to crime*. Washington, DC: US Department of Justice, Office of Justice Programs, National Institute of Justice.

Sampson, R. J., & Wooldredge, J. D. (1987). Linking the micro-and macro-level dimensions of lifestyle-routine activity and opportunity models of predatory victimization. *Journal of quantitative criminology*, *3*(4), 371-393.

Shaw, C. R., & McKay, H. D. (1942). Juvenile delinquency and urban areas. University of Chicago Press.

Sherman, L. W., Gartin, P. R., & Buerger, M. E. (1989). Hot spots of predatory crime: Routine activities and the criminology of place. *Criminology*, *27*(1), 27-56.

Smith, W. R., Frazee, S. G., & Davison, E. L. (2000). Furthering the integration of routine activity social disorganization theories: Small units of analysis and the study of street robbery as a diffusion process. *Criminology*, *38*(2), 489–524. https://doi.org/10.1111/j.1745-9125.2000.tb00897.x

Song, J., Andresen, M. A., Brantingham, P. L., & Spicer, V. (2017). Crime on the edges: Patterns of crime and land use change. *Cartography and Geographic Information Science*, *44*(1), 51-61

Stucky, T. D., & Ottensmann, J. R. (2009). Land use and violent crime. *Criminology*, *47*(4), 1223–1264. https://doi.org/10.1111/j.1745-9125.2009.00174.x

Twinam, T. (2017). Danger zone: Land use and the geography of neighborhood crime. *Journal of Urban Economics*, *100*, 104-119.

Weisburd, D., & Green, L. (1994). Defining the drug market: The case of the Jersey City DMA system. *Drugs and crime: Evaluating public policy initiatives*, 61-76.

Weisburd, D., Bushway, S., Lum, C., & Yang, S. M. (2004). Trajectories of crime at places: A longitudinal study of street segments in the city of Seattle. *Criminology*, *42*(2), 283-322.

Weisburd, D., Groff, E. R., & Yang, S. M. (2014). The importance of both opportunity and social disorganization theory in a future research agenda to advance criminological theory and crime prevention at places. *Journal of research in crime and delinquency*, *51*(4), 499-508.

Weisburd, D., Maher, L., Sherman, L., Buerger, M., Cohn, E., & Petrisino, A. (1992). Contrasting

crime general and crime specific theory: The case of hot spots of crime. *Advances in criminological theory*, *4*(1), 45-69.

Wilcox, P., & Eck, J. E. (2011). Criminology of the unpopular: Implications for policy aimed at payday lending facilities. *Criminology & Pub. Pol'y*, *10*, 473.

Wilcox, P., Quisenberry, N., Cabrera, D. T., & Jones, S. (2004). Busy places and broken windows? Toward defining the role of physical structure and process in community crime models. *Sociological Quarterly*, *45*(2), 185–207. https://doi.org/10.1111/j.1533-8525.2004.tb00009.x

Wiles, P., & Costello, A. (2000). *The'road to nowhere': the evidence for travelling criminals* (Vol. 207). London: Home Office.

Willits, D., Broidy, L., & Denman, K. (2013). Schools, neighborhood risk factors, and crime. *Crime & Delinquency*, *59*(2), 292-315.

Wo, J. C., & Kim, Y. A. (2020). Neighborhood Effects on Crime in San Francisco: An Examination of Residential, Nonresidential, and "Mixed" Land Uses. *Deviant Behavior*, 1-18.

World population. World Population Statistics. (n.d.). Retrieved November 16, 2021, from https://populationstat.com/.

Wuschke, K., & Kinney, J. B. (2018). Built environment, land use and crime. *The Oxford handbook of environmental criminology*, 475-496.

Wysong, E. (2001). [Review of *Las Vegas: The Social Production of an All-American City*, by M. Gottdiener, C. C. Collins, & D. R. Dickens]. *Contemporary Sociology*, *30*(2), 172–173. https://doi.org/10.2307/2655411

Zandbergen, P. A. (2008). A comparison of address point, parcel and street geocoding techniques. *Computers, Environment and Urban Systems*, *32*(3), 214-232.

CURRICULUM VITAE

STACEY L. CLOUSE

University of Nevada, Las Vegas
Las Vegas, Nevada 89154-5033
Email: stacey.clouse@unlv.edu; stacey.clouse07@gmail.com

EDUCATION

2022	**PhD, Criminology and Criminal Justice** University of Nevada, Las Vegas (ABD)
2021	**Affiliate, Criminology and Criminal Justice** University of Cincinnati
2018	**M.A. Criminology and Criminal Justice** University of Nevada, Las Vegas
2015	**B.A. (Honors) Criminal Justice**, University of Nevada, Las Vegas Minor in Psychology, *Cum Laude*
2013	**A.A. (High Honors) Criminal Justice.** College of Southern Nevada

WORK EXPERIENCE

2021-current	**Consultant for the UC Center for Police Research and Policy** Provide expert assistance and comprehensive project management support to teams of police investigators in Las Vegas and Tucson on how to identify and dismantle violence offender networks. I also serve as co-principal investigator ensuring effective strategy implementation, documentation of methods, and promoting collaboration between city and county officials to reduce gun violence.

2020-current **Project manager**- **Place Network Investigations**
Gun Violence Reduction Strategy
Comprehensive project management support to teams of police investigators in Las Vegas. Key role in overseeing strategy, process, implementation, and documentation of Place Network Investigations (PNI) with six Las Vegas Metropolitan Police Department area commands.

2019-current **(Bureau of Justice Administration) Byrne Criminal Justice Innovation-** Provide technical and research assistance to law enforcement agencies and community partners nationwide on grant proposals and place based, community-oriented violent crime reduction strategies.

2018-2020 **Graduate Research Associate/ Lab Manager**
University of Nevada, Las Vegas
Work for Dr. Tamara Herold (formerly Madensen)
Lead teams as the principal investigator on multiple assigned research projects. Key role in developing and overseeing strategy, methodologies, data collection, implementation, and documentation of several research projects.

2016-2018 **Graduate Research/ Teaching Assistant**
University of Nevada, Las Vegas
Work for Dr. Tamara Herold and Dr. Terrance Miethe
Lead teams as the principal investigator on multiple assigned research projects. Key role in developing and overseeing strategy, methodologies, data collection, implementation, and documentation of several research projects.

2013 **Internship- Department of Homeland Security**
Immigration and Customs Enforcement
Las Vegas, Nevada field office

TEACHING EXPERIENCE

2022 **Guest Speaker**
Undergraduate crime prevention class

2021-2022 **Undergraduate Statistics**
Co-taught introduction to statistics (in person and remote)

2021 **Guest Speaker**
Undergraduate introduction to policing class

2022 **Introduction to Administration of Justice**
Undergraduate course. Teacher on record (remote)

2019 **Teaching Practicum**
Doctoral level teaching course

FUNDING, HONORS, AND AWARDS

2022 Commendation Award, Las Vegas Metropolitan Police Department
Award for outstanding performance and sacrifice assisting police.

2020 Criminal Justice Graduate Research Fund Award
University of Nevada, Las Vegas
$3500.00

2019 Scholarship to attend an ICPSR course on Network Analysis
University of Michigan
$2500.00

2019 Impact Award for Community Engagement
Service Learning and Leadership scholarship
University of Nevada, Las Vegas
$500.00

2019 Impact Award for Community Engagement
Gold Community Engagement Certificate-
Serving over 100 hours of community service
University of Nevada, Las Vegas

2019 Impact Award for Community Engagement
Community Based Participatory Research Award for an Individual-
Outstanding commitment to advance learning, justice, and social change with the community.
University of Nevada, Las Vegas

2019 Commendable Action Award
Recognition for assisting the Las Vegas Metropolitan Police Department in identifying and disrupting violent criminal infrastructure.

2019	GPSA-Conference travel funding $600.00 to cover the cost of travel for the Western Society of Criminology conference. University of Nevada, Las Vegas
2019	GPSA-Conference travel funding $600.00 to cover the cost of travel for the American Society of Criminology conference. University of Nevada, Las Vegas
2018	GPSA-Conference travel funding $650.00 to cover the cost of travel for the American Society of Criminology conference University of Nevada, Las Vegas
2018	GPSA- Conference travel funding $450.00 to cover the cost of travel for the Academy of Criminal Justice Sciences conference University of Nevada, Las Vegas
2017	GPSA- Conference travel funding $850.00 to cover the cost of travel for the American Society of Criminology conference University of Nevada, Las Vegas
2016	Kriss Drass Undergraduate Student Research Award $500.00. Conducting an outstanding research project under faculty supervision. Crowd Management Research Council lab University of Nevada, Las Vegas
2015	Dan Riley Endowment Scholarship $3500.00. Award for outstanding undergraduate student dedicated to major in criminal justice. University of Nevada, Las Vegas
2015	Dean's Honor List Greenspun College of Urban Affairs. University of Nevada, Las Vegas.

2014	Dean's Honor List Greenspun College of Urban Affairs. University of Nevada, Las Vegas.
2013	Dean's List College of Southern Nevada (Fall and Spring term)
2013	Presidents List College of Southern Nevada (Fall term)
2012	New Hope Foundation $1000 Academic scholarship for women returning to school College of Southern Nevada

ACADEMIC AND PROFESSIONAL SOCIETIES

2022- current	PHI KAPPA PHI
2019-current	Western Society of Criminology
2017- current	Academy of Criminal Justice Sciences
2016- current	American Society of Criminology
2015	The National Society of Collegiate Scholars Scholarship, Leadership and Service University of Nevada, Las Vegas
2015	ALPHA PHI SIGMA- Theta Tau Public Relations Officer University of Nevada, Las Vegas
2012-2014	PHI THETA KAPPA College of Southern Nevada

CERTIFICATIONS

2021	Spatial and Crime Analysis Certificates; Esri

2021	CITI Certification Ethics Training in Human Research
2020	Research and Mentorship Program (RAMP) certification
2020	Mentorship Certificate
2019	Inter-University Consortium of Political and Social Research Summer Program in Quantitative Methods of Social Research (ICPSR); Network Analysis 1: Introduction. University of Michigan, Ann Arbor. Taught by Ann McCranie.
2018	Grad Rebel Writing Bootcamp
2017	Leadership Certificate USMC
2017	CITI Certification Ethics training in human research

POSTER PRESENTATIONS

2019	Swanberg, Kaitlyn, **Clouse, S.L.,** Herold, Tamara (2019). P.I.V.O.T: Identifying offender networks in Las Vegas. Undergraduate Research Forum, November 2019.
2019	**Clouse, S. L.,** Donnelly, Joshua, & Sousa, William (2019**).** Assessing Perceptual Differences Between the Police and Citizens Using the RDFC Interaction Model. American Society of Criminology, November 2019
2019	Donnelly, Joshua W., **Clouse, Stacey L**., & Sousa, William (2019). The concentration of gun violence using ShotSpotter data: A Las Vegas inquiry. American Society of Criminology, November 2019
2018	Misker, Samrawit A., **Clouse, Stacey L**., & Madensen-Herold, Tamara D. (2018). Medical Response During Mass Casualty Incidents. Honors College student research forum. Served as a graduate student mentor to an undergraduate student
2017	**Clouse, S. L**., Kennedy, L. P., & Madensen, Tamara D. From Verbal Judo to Physical Restraints: A Multi-disciplinary Content Analysis of De-escalation Techniques. American Society of Criminology (ASC), Philadelphia.

PRESENTATIONS

2020 **Clouse, Stacey L**. & Herold, Tamara D. (2020). Displacement and Environmental Design: A Las Vegas Study. American Society of Criminology. November 2020 (Cancelled due to Covid-19).

2020 **Clouse, Stacey L**. & Herold, Tamara D. (2020). Crime and Place Networks: A Las Vegas study. Western Society of Criminology. February 2020.

2019 **Clouse, Stacey L**. & Madensen- Herold, Tamara D. (2019). Public perceptions of police interventions. 21st Annual Graduate & Professional Student Research Forum

2018 Madensen-Herold, Tamara D., Sousa, William H., **Clouse, Stacey L**., & Donnelly, Joshua W. (2018). Crime Place Networks: Eliminating Infrastructures for Criminal Activity.

2018 **Clouse, Stacey L**. & Madensen- Herold, Tamara D. (2019). Public perceptions of police interventions. American Society of Criminology, November 2018

2018 **Clouse, Stacey L.** (2018). Police Interventions, Public Perceptions, and The RDFC Interaction Model. Academy of Criminal Justice Sciences (ACJS), New Orleans

2017 **Clouse, Stacey L**. (2017). Police Interventions, Public Perceptions, and The RDFC Interaction Model. 3MT (3 Minute Thesis Competition) Rebel Grad Slam

RESEARCH EXPERIENCE

2021-2022 **Field Research**
Qualitative filed research with Las Vegas Metropolitan Police Department

2020-2021 **Field Research**
Qualitative filed research with Las Vegas Metropolitan Police Department

2019-2020 **Field Research**
Qualitative filed research with Las Vegas Metropolitan Police Department

2019-current **(Bureau of Justice Administration) Byrne Criminal Justice Innovation-** Provide technical and research assistance to law enforcement and community partners nationwide on grant proposals and place-based community-oriented violent crime reduction strategies.

2019 **Center for Crime and Justice Policy- Research Associate/Lab Manager** for the Tourism Security & Crowd Science Research Lab
Graduate research associate, manager, and principal investigator for the continued project of: Tactical Medical response to mass casualty incidents.

2018-2019 **Field Research**
Qualitative filed research with Las Vegas Metropolitan Police Department

2018 **Center for Crime and Justice Policy- Research Associate/Lab Director** for the Tourism Security & Crowd Science Research Lab
Graduate research associate, lab director/manager, and principal investigator for the continued project of: Tactical Medical response to mass casualty incidents.

2018 **Research Associate National Science Foundation Grant #1625808**
Principle investigators: Dr.'s Terrance D. Miethe and Joel D. Lieberman
Active role in conducting qualitative research within the community, coding data, and organizing teams.

2017-2018 **Field Research**
Qualitative filed research with Las Vegas Metropolitan Police Department

2017 **Research Associate National Science Foundation Grant #1625808**
Principle investigators: Dr.'s Terrance D. Miethe and Joel D. Lieberman
Active role in conducting interviews within the community, coding data, and organizing teams.

2017 **Hope for Prisoners, Train the Trainer Manual**
Assisted Dr. Alexis Kennedy and Dr. Emily Troshynski by contributing two chapters to a training manual. One chapter was regarding the development of parenting skills and the other chapter was regarding the development of professionalism and interviewing skills.

2017 **Center for Crime and Justice Policy- Crowd Management Research Counsel**
Graduate research assistant and lead investigator for the project of: Tactical Medical Response to Mass Casualty Incidents.
Developed a working relationship with the United States Marshal tactical medics and search and rescue operators, and the Las Vegas Convention Visitors Authority.

2016 **Center for Crime and Justice Policy- Crowd Management Research Counsel**
Graduate research assistant and team lead. Systematic literature review of de-escalation practices for the International Association of Chiefs of Police (IACP) guided by Dr. Tamara Madensen.

2015 **Center for Crime and Justice Policy- Crowd Management Research Counsel**
De-escalation strategies for law enforcement, guided by Dr. Tamara Madensen.

***Extensive experience translating and teaching complex concepts to law enforcement and students.**

MANUSCRIPTS IN PROGRESS/UNDER REVIEW

Clouse, S. & Kail, R. (2021). What do bermudagrass and hot spots have in common? Re-imagining theoretical frameworks to understand hot spots (in progress).

Clouse, S. (2021). The Networked Neighborhood: A Contribution to Understanding the Persistence of Hot Spots (in progress).

Kennedy, L., & **Clouse, S**. (2021). Iron fist or velvet glove? An examination of protest policing in the United States (revise and resubmit).

Clouse, Stacey L., Donnelly, Joshua, & Kennedy, Logan P. (2019**).** Assessing Perceptual Differences Between the Police and Citizens Using the RDFC Interaction Model (in progress).

PUBLICATIONS

Park, S. M., Hong, Y. O., Kennedy, L. P., & **Clouse, S. L**. (2021). Pathways from relative deprivation to individual violence: the effect of subjective perception and emotional resentment in South Korea. *The British Journal of Criminology*, *61*(6), 1469-1485.

Herold, T. D., Engel, R. S., Corsaro, N., & **Clouse, S. L**. (2020). Place network investigations in Las Vegas, Nevada: Program review and process evaluation.

Clouse, S. (2019). A review of actor-network theory and crime studies: D. Robert and M. Dufresne: Actor-network theory and crime studies: Explorations in science and technology. Oxon, UK and New York, USA: Routledge, 2106, 145pp, US $84.67 HB. *Metascience*, *28*(3).

Clouse, S. L. (2018). Police interventions, public perceptions, and the RDFC interaction model (Master's Thesis, University of Nevada, Las Vegas).

ANALYTICS

- SPSS- Statistical analysis software

- M-Plus- Statistical analysis software
- ArcGIS Pro- Geospatial mapping and statistical analysis software
- Qualtrics and Survey Monkey- Survey Development and Analysis
- Qualitative Research
- PowerPoint
- Data Entry
- Microsoft Word

CURRENT PROJECTS

2019 Reducing Gun Violence in Las Vegas Communities through Police-Researcher Partnerships.
Place-Based Investigations of Violent Offender Territories (PIVOT), a collaborative project with the Las Vegas Metropolitan Police Department.

SERVICE: ACADEMIC AND COMMUNITY

Las Vegas Metropolitan Police Department (2018-current)

Consultant with the Las Vegas Metropolitan Police Department to assist in identifying violent offender and place networks to reduce community violence.

Project 150

Packaging Thanksgiving meals for homeless teenagers and their families
Packaging Christmas meals for homeless teenagers and their families
Organization of contents in the warehouse

Angel Tree

Anonymous Christmas gifts for the children of individuals incarcerated in Nevada.

St. Judes Ranch (Boulder City, Nevada)

Volunteered time to severely abused, neglected, and abandoned children.