

ABSTRACT

Title of Document: PICTURE ME ROLLIN': AN ANALYSIS OF CALIFORNIA GANG HOMICIDES ACROSS SPACE AND TIME.

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Gang homicide rates have fluctuated considerably over the last three decades, as the problem spread to new locations and established strongholds in certain urban epicenters. Unfortunately little is known about the nature of this spread, either over space or time. This thesis employs the FBI Uniform Crime Reports Supplementary Homicide Reports in a descriptive study of gang homicide in the State of California, with a particular focus on Los Angeles County. Geographic Information Systems analysis and trend graphs are implemented in an attempt to identify patterns within gang homicide activity for the years 1976 through 2007. The discussion considers the meaning of the geographic and temporal trends with regard to diffusion and offers avenues for future research.

PICTURE ME ROLLIN': AN ANALYSIS OF CALIFORNIA GANG HOMICIDES
ACROSS SPACE AND TIME.

By

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Chapter 1: Introduction

Emerging cultural trends and innovations, which can include fashion, technology, or even new drugs, rarely appear nation-wide simultaneously; new phenomena typically emerge in metropolitan regions first and then spread to other cities and surrounding suburbs over time (Fischer, 1978). The expansion of phenomena over space and time is attributed to either the innovation or imitation of new ideas (Cohen & Tita, 1999). Previous research has attempted to explain this spread as being the result of different mechanisms of “diffusion”. One such method of spread is “hierarchical diffusion,” which suggests the timing of exposure to new trends tends to correlate with the size of a geographic area, with large cities experiencing novel products much earlier than less populated areas (Cohen and Tita, 1999; Hunt, 1974). “Spatial contagion” is a similar process, except that phenomena spread immediately outward from a geographical center to nearby communities, relying more on physical contact than on size or urbanicity (Cohen & Tita, 1999; Wallace et al, 1997). These dispersion mechanisms were observed in the mid-twentieth century with the spread of television and fluoridated water policies (Crain, 1966) and later on with the diffusion of heroin and crack cocaine markets (Golub and Johnson, 1997; Hunt, 1974).

During the 1980’s and early 1990’s, major metropolitan regions of the United States (Chicago and Los Angeles, in particular) began to experience what many have referred to as an “epidemic” of street gangs and gang-related homicides. Over time, violent street gangs became more embedded in urban centers and spread across the nation; this spread continued into small cities, suburban counties and even rural areas

(Howell, 1998). Following two decades of incubation and spread, by 2002 there were over 700,000 gang members, and more than 21,500 gangs nation-wide, with 89 cities reporting at least one gang-related homicide in 2002 (Egley and Major, 2004). While findings have been inconsistent with regard to whether the spread of violent gangs is interrelated with other phenomena such as “crack” cocaine and AIDS (Howell, 1999; Wallace et al, 1997), it does appear that they have emerged and dispersed in similar fashions.

As the violent gang problem began to grow and spread, it inspired a wealth of criminological research; however, few studies considered how the “epidemic” dispersed across cities and into the suburbs. Instead, much of the current research on gang activity focuses primarily on individual cities and their short-term longitudinal trends (Block & Block, 1993; Miller & Decker, 2001; Decker & Curry, 2002; Hutson et al, 1994; Rosenfeld et al, 1999). Some of the city-level studies estimate the number of gang members, gang prevalence based on population (i.e., cities versus rural areas), and racial/ethnic identification of members (Egley 2002; Egley & Ritz, 2006). Studies focusing on homicide and longitudinal trends have analyzed a wide range of topics from the relationship of gang organization to homicide patterns (Decker & Curry, 2002), gender and violence (Miller & Decker, 2001), changing patterns in gang homicide rates (Hutson et al., 1995), and different forms of gang homicides (i.e. gang affiliated, as opposed to gang motivated) (Pizarro and McGloin, 2006; Rosenfeld et al, 1999). Despite this wide scope of information, there is a void in longitudinal research analyzing how gang homicide trends spread geographically

across metropolitan regions and suburbs, and what these growth trends actually look like.

Another area of interest that has yet to receive much attention is the temporal patterns in violent gang activity. While a number of studies have attempted to explore patterns in market establishment for drugs, the same frameworks have yet to be applied to the development of gang homicides. For example, one model has broken down the growth and lifespan of crack cocaine markets into four steps: incubation, expansion, plateau, and decline (Golub & Johnson, 1997). This framework explains the establishment of a drug market, recruitment of new users, and how attrition and disinterest by younger generations creates decline. Although city-level analyses have revealed differing patterns across cities for links between crack markets and gangs (Blumstein et al., 1999), that is not to say that they do not establish themselves in similar ways. As gang violence and crack cocaine typically affect the same demographic populations, particularly targeting the urban underclass (Cohen & Tita, 1999; Curry & Spergel, 1988), it seems plausible that the epidemics could develop in similar manners. Gang homicide has yet to be studied in the context of epidemic phases, so it is possible that warning signs indicative of a marked growth in gang violence have consistently been overlooked simply because we do not know how to recognize them.

In an attempt to help fill the void in violent gang literature, this study will analyze the longitudinal dynamics of gang homicides across the state of California with a specific focus on Los Angeles County. The research will employ a two-

method approach, using GIS spatial analysis mapping and descriptive analysis of within-city gang homicide trends in an attempt to answer the following questions:

Question 1: How do gang homicides “spread” geographically? Are variables such as population or proximity to a central city related to the spread of gang homicide?

Question 2: Do gang homicides follow typical patterns of incubation, increase, plateau, and decline?

Addressing Question 1 will require the application of ArcGIS software. In this analysis, plotting longitudinal gang homicide data will show if expansion of violent gang activity adopts any clear patterns of diffusion, including if gang homicide contagion appears to be related to population density or proximity to a central city. This will be evaluated by generating a GIS map that will display two layers of information: one layer will indicate city population and the other will indicate the number of gang homicides. The GIS analysis will be supplemented with two correlation calculations, which will compare the strength of the relationship between population and gang homicide frequency to the relationship between city center distance and gang homicide frequency for 32 years worth of data. Question 2 will be addressed by analyzing trend graphs for a sample of cities that demonstrated growth in gang homicides over time.

To address these questions, this thesis relies on the Uniform Crime Report Supplementary Homicide Reports (SHR) data for the state of California. The SHR data are published by the Federal Bureau of Investigation and are an exhaustive national record of homicides in the United States. These data provide information

regarding offense, victim, and offender characteristics, including gang-related circumstances, location, and year. Specifically, this study will make use of records spanning the years 1976 through 2007. This will be a case study of California, with an extensive focus on Los Angeles County, due to the continuous and steady reporting of gang homicides across the time period; other states show inconsistent and unreliable reporting rates, making them poor candidates for inclusion in this study. Moreover, California and specifically Los Angeles County is a wise choice in which to study gang homicide because of its long history of gang problems, which began around the industrial era, and its unofficial title as a “youth gang homicide capital” (Howell, 1998, 1999). Even so, one should recognize that focusing this study on one specific region will limit the generalizability of the findings to just the geographic area studied.

Answering the two research questions and thereby increasing understanding of how malignant anti-social phenomena such as violent gangs establish and diffuse can be of great use for developing and implementing policy. Studying spatial diffusion characteristics could increase collective knowledge about what makes different regions particularly susceptible to certain types of crime. Learning what types of communities are at highest risk for violent gang activity could lead to a more efficient and effective allocation of programming and resources. Likewise, understanding the temporal characteristics of diffusion could help legislators and law enforcement identify violent gangs in “incubation phases” and work towards preventing their further development and spread.

Chapter 2: Literature Review

Defining epidemics as a way to look at crime

An epidemic is a period of rapidly accelerating growth followed by a later period of decline (Cohen and Tita, 1999). “Epidemic” does not necessarily refer to something negative, but rather a contagious phenomenon that has large-reaching effects and experiences a point of sudden change or a “tipping point” (Gladwell, 2002). An important feature of epidemics is that they are not static, but instead spread dynamically across both space and time. As a consequence then, the diffusion patterns of all types of epidemics, both crime and non-crime, can be measured and assessed with both geographic and temporal models.

Geographic Spread of Phenomena

Novel products, policies, and ideas typically first appear in an urban metropolis, and later expand to its surrounding region through either spontaneous innovation or imitation (Borchert, 1972). For example dispersion mechanisms were observed in the mid-twentieth century when the expansion of household television technology shifted from large to smaller cities over time (Hunt, 1974). Contagious and hierarchical diffusion are two forms of this expansion, where the epidemic spreads beyond an urban center, as the originating place continues to experience high levels of the outbreak (Cohen & Tita, 1999).

Hierarchical diffusion occurs when phenomena move from regional centers outward to neighboring communities in a “hopscotch pattern” from the densest cities to sequentially smaller ones over time (Cohen & Tita, 1999; Hunt 1974; Wallace et

al, 1997). This diffusion of phenomena occurs as the result of widespread media and the expansion of ideas across space, relying more on communication, and less on physical proximity (Cohen & Tita, 1999; Singh et al, 2008). When observing the diffusion process for social and political opinions, rates of adoption are directly associated with the size of the community; acceptance of innovation occurs earlier in large cities than in rural areas. As urban regions typically adopt new ideas sooner than smaller regions, an innovation gap or “time lag” continues to exist between urban and rural regions (Fischer, 1978). Hierarchical diffusion was displayed in Wallace et al.’s (1997) model of the spread of AIDS in the United States; the study found violent crime and AIDS populations coincided, suggesting that marginalized inner-city neighborhoods represent “keystone populations” for the spread of epidemics. As violent crime has spread from the largest cities in the country to the smaller surrounding metropolitan regions in a pattern consistent with hierarchical diffusion, the AIDS population has followed suit, suggesting social disintegration as a possible mechanism for the spread of destructive epidemics (Wallace et al, 1997). While the hierarchical diffusion paradigm attempts to explain geographic spread as a function of population density, it does not take the proximity of a city or a town to the metropolitan center into consideration.

The contagion diffusion or “spatial expansion” mechanism differs from hierarchical diffusion by spreading radially from the metropolitan epicenter outward, in a fashion similar to a wine stain spreading on a tablecloth (Wallace et al, 1997). Whereas hierarchical diffusion is more concerned with population size and

communication networks, contagion focuses more on geographic proximity¹. Spread from both expansion mechanisms has been associated with metropolitan commuting paths, with spatial contagion existing on a smaller scale than hierarchical diffusion, usually dispersing within 100 miles or less from the city center (Wallace et al., 1997). Spatial diffusion was seen with the adoption of fluoridated water policies in the 1960s, where neighboring regions had a tendency to adopt legislation around the same time (Crain, 1966). Cities that were further apart had less communication than neighboring cities, so distance from the “keystone city” played a crucial role in how quickly the new policy spread.

Spatial contagion has also been considered as the mechanism behind the spread of some crime trends, such as the spread of crack cocaine in the 1980s. The crack epidemic began on the east and west coasts in the mid-1980s, and then over time moved inland from the shores to the rust belt and the south (Blumstein et al, 1999). Typically two to three years after crack first arrived in a region, a “change point” in behavior would occur, marked by increased juvenile arrests and homicides. This finding serves as an example that epidemics such as crack cocaine can expand both spatially, from shores to the heartland, as well as temporally, experiencing different phases across time.

Temporal Diffusion

Whereas geographic diffusion measures the physical spread of a phenomenon, temporal diffusion refers to the epidemic’s timeline in a single location. Most

¹ Although hierarchical and spatial diffusion are presented here as contrasting views, they are in fact quite similar. The relationship between these two models will be explicated in a later section discussing how they will inform this study.

epidemics tend to experience four distinct phases: incubation, expansion, plateau, and decline (Golub & Johnson, 1997). The incubation phase refers to a period of time during which a small, core group introduce a new phenomena, and is followed by an expansion phase, when the epidemic grows rapidly among associates and social networks of those in the initial group. Once the epidemic is established it enters a plateau phase, during which it maintains a certain “carrying capacity” of participants. Lastly as interest in the phenomena lessens as the entity becomes outdated or replaced, it enters the fourth phase, decline (Golub & Johnson, 1997).

The four phase epidemic trend has been observed in the expansion and decline of the crack cocaine market in the 1980’s and 1990’s. The crack market began with a small population of hardcore users (incubation) who expanded the market to friends and acquaintances (expansion); crack became popular and established itself as the drug of choice among users (plateau); when young people were no longer interested in the drug and not replacing the former users crack use entered the period of general decline, leaving just the hardcore base as continued users (Golub & Johnson, 1997).

These phases help to explain what has been referred to as the “fad effect”, during which phenomena experience a peak period of enthusiasm followed by a sharp decline due to competition, and then gradually enter a period of normalcy (Crain, 1966). The fad effect can be explained, at least in part, by the “two step flow” hypothesis, in which new ideas travel through the social structures of mass media individual influence² (Crain, 1966). Studies focused on voting patterns in particular have found that personal influence and perception are the driving force behind

² Some of the increasing popularity of violent youth gangs has been attributed to media glamorization of teenage rebellion as big-city gang and drug dealing lifestyles (Hagedorn, 1998).

propaganda media campaigns, but that both aspects (social and media) need to be involved for the information to have an effect (Crain, 1966).

The “tipping point” refers to the situational criteria and characteristics that, when reached, allow for a phenomenon to transcend the “incubation phase” and become a full-blown epidemic. For example, violent crime rates can increase dramatically when certain situational characteristics reach a critical level (e.g. when a riot reaches such a large size that the cost of joining in diminishes³), changing the rate rapidly in a short period of time; another tipping point may occur when the homicide rates are so high as to cause public alarm, which works to force them back down (LaFree, 1999; McDowall, 2002). Tipping points are important for understanding the creation and maturation of an epidemic; however as tipping points are difficult to identify and not specifically relevant to the core research questions, they will not be directly addressed in the present study. However, if a few years consistently precede sudden growth across multiple cities, it may lead to speculation and further inquiry about what factors were unique to that period that could have influenced the increase in gang homicide.

Understanding the Diffusion of Gang Homicide

Gang homicide, as with most supposed epidemics, is thought to have first started in an urban metropolis and then expanded to other regions over time. As there has been minimal research concerning the spread of gang-related homicides, this study will be motivated by traditional diffusion paradigms, including hierarchical and

³ A tipping point is similar to a “threshold”, which refers to the number of other individuals who must make the decision to join in a criminal act before a particular actor does; this is the point at which the overall benefits exceed the costs (Granovetter, 1978; see also McGloin and Piquero, 2009).

contagion theories of expansion. If a diffusion trend is found, it would most likely be a hybrid of the two models discussed earlier, influenced by a combination of population, communication, and proximity. Uniform temporal diffusion would be indicated if the gang homicide data for individual cities followed the phases of other phenomena.

Analysis of existing gang homicide trend data for the United States supports the notion that the problem has expanded from primarily urban areas to less dense regions over time. Of the 142 cities nation-wide with populations greater than 100,000 that submitted gang-related data in 2002, 64% (n=91) reported at least one homicide. The total number of deaths was 1,887, with Chicago and Los Angeles responsible for 35% (n=655) (Egley & Major, 2004). Results from the National Youth Gang Survey in recent years have shown all large cities with populations of 250,000 or greater experience gang problems, with 91% reporting at least one gang homicide between years 1999 and 2000 (Egley, 2002; Egley & Major, 2004). By 2004, more than half of the 1,000 homicides in Los Angeles and Chicago were gang related, and the overall count was 11% higher than the previous eight year average (Egley & Ritz, 2006). The most populated urban regions appear to be at the greatest risk for developing violent gang problems. Large cities and suburban counties account for approximately 85% of gang members, which have recently been estimated to exceed 750,000 among around 21,500 gangs (Egley, 2002; Egley & Major, 2004). The 15% of homicides not in urban or suburban areas support the idea that gang homicides are not exclusive to urban areas alone, the way in which they spread is still unknown.

It can be argued that the geographic diffusion process has in part been encouraged by neighborhood gentrification, which has been taking place in cities nationwide since the 1980s. High crime and slum areas are purchased by the city, business moguls, and real estate developers, who then evict the tenants, homeless, squatters, and whoever else had been using the space in order to make room for luxury residences, office and retail space, and other attractions (Smith, 1996). As a result, poor Americans have been systematically pushed outside of cities, and suburban neighborhoods have experienced higher poverty rates. By 2000 half of all people living below the poverty level lived in the suburbs (Katz & Schnebly, 2008). These suburban communities experiencing economic deprivation, social disadvantage, disorganization, and limited resources provide ideal conditions for violent gangs to take hold. As the number of violent youth gangs and disadvantaged suburbs concurrently increase, it would seem logical that the two phenomena could be interrelated; it could even be argued that urban gentrification projects were the tipping point for the spread of gangs.

Other research also provides some indirect guidance on why gangs and gang homicides may diffuse across time and space. Crane et al (2000) identified five primary factors, in addition to peer influence, that can support the growth and spread of gangs. First, as membership rises, sub-cultural norms within communities evolve to recognize gang membership as a form of status; second, the development of a large gang can establish a black market for drugs and other illegal goods, and give the gang a place within the local infrastructure; third, an increase in crime associated with gangs can oust the neighborhoods legitimate business operations; fourth, the creation

of one gang may lead to the formation of other gangs for protection; lastly, gang rivalries can assist with both coercion and recruitment of additional members. This suggests that gang membership has the potential to increase in a manner consistent with epidemics; it therefore is quite possible that violent gang activity would follow in a similar trend.⁴

While the spread of gang homicide has affected the entire United States, the present study will examine the state of California. Focusing on a single state will allow for more nuanced observation of regional spread, both over time and space, and as California has one of the oldest and largest gang problems of any state, it creates an optimal source for gang homicide data. Furthermore the state of California is ideal for this particular study due to its continuous and steady reporting of gang homicides to the UCR across the time period; other states showed inconsistent and unreliable reporting rates, making them poor choices for a case study. As California has one of the oldest gang problems, dating back as far as the industrial era, it is possible that it is a keystone location to other states. Thus it makes the most sense to focus this research on what is possibly the root of the problem, rather than on state that may simply be mimicking or recreating what initially occurred in California⁵.

⁴ The diffusion of gang homicides is most likely a one directional trend, expanding from city centers beyond, unlikely to ever occur in the opposite direction, with suburban gangs spreading to the nearby urban region. Small town gangs are less likely to become institutionalized, as many of the youths involved in gangs move to bigger cities as adults, and leave behind their organization without seniority (Hagedorn, 1998). Further, it is more difficult to commit serious crimes, or operate a drug sales ring in a smaller community where people are more likely to know each other (Hagedorn, 1998), resulting in a higher number of gang offenders either being incarcerated, or deterred from serious offenses. As a result, we can expect the overall epidemic to be shorter lived in smaller communities than for large cities, who arguably have the infrastructure and anonymity for a violent gang to be sustained.

⁵ An additional discussion regarding the selection of California, as well as its limitations, will be included in Chapter 3.

Geographic Diffusion of Gang Violence

Though diffusion paradigms have been applied to gang research only sparingly, there nonetheless exist contradictory results. The spread of gang violence has been studied in a number of contexts, typically informed by hierarchical or contagion processes. One controversial theory developed to explain the spread of gang activity suggests that members from large gangs migrate to other cities to establish new chapters of their organizations, which could result in a “hop scotch” pattern of gang activity and violence. In 1994 the National Drug Intelligence Center identified what they called “a noticeable spread of Bloods/Crips gangs across the United States in the late 1980’s and early 1990’s” (Howell, 1998). By 1996 the problem had spread beyond the initial large city populations to the point where almost 75 percent of cities with populations over 25,000 reported youth gangs; while more than half of suburbs also reported gangs, the levels of involvement and crime depended on location (Moore & Terrett, 1999). Gangs contending allegiance with the Los Angeles based Bloods or Crips were reported in 180 jurisdictions among 42 states, while Chicago based gangs were found in 110 jurisdictions among 35 states (Howell, 1998). This alleged mechanism has been referred to as a crude mafia stereotype of gangs being organized into franchises or syndicates (Hagedorn, 1998).

“Franchising” is both an example of how diffusion has been applied to gang research and the challenges involved in attempting to isolate hierarchical diffusion from contagion processes when studying the spread of gang violence. Due to the high level of communication of ideas and physical movement of people across large cities, it would not be possible to determine one diffusion mechanism to be

responsible, absent of another. The violent gang diffusion argument has been modified over time to adjust to the rejection of the syndication, or “franchising” theory.

A 1989 study of gangs in Cleveland, Ohio found no significant evidence of any gang being a chapter or affiliate of a gang from any outside cities, but instead found that gang leaders who moved to Ohio from large gang cities such as Chicago or Los Angeles functioned as more proficient leaders with strong recruiting skills (Huff, 1989). Some even reject the “symbolic association” argument, that these relocated members would name a new crew after their former Los Angeles or Chicago gang due to the flair of the name alone (Hagedorn, 1998). Others have suggested that experienced gang members in new cities are the result of families with children in gangs moving to seek out better lives and gang-free environments (Hagedorn, 1998). Current research suggests that most gang problems are homegrown, and intercity migration of gang leaders in fact contributes little to local crime and drug trafficking (Howell, 1998; Maxson, 1998).

Other explanations of gang homicide diffusion take a retaliation-centered approach. Gang-motivated homicides are often preceded by other violent incidents, and can have a snowballing effect; this retaliatory relationship suggests that increases in gang homicides could be a function of geographic proximity to other violent gangs and the “street code” shared by local organizations (Kubrin & Weitzer, 2003; Tita & Griffiths, 2005). Homicides tend to persist within the organizational memory of a gang, which is governed by its own laws of retaliation and equivalence (Papachristos, 2006). Gang homicides are thus influenced by geographic proximity, which affects

the amount of contact gangs have with one another, and temporal proximity to prior offenses that may have yet to be avenged. Retaliation has previously been linked to crime as its own form of social control by explaining sudden peaks in assaults, drive-by shootings, and homicides among gang members (Decker, 1996). The majority of gang homicides occurred in neighborhoods where street gang activity centered on turf battles, not drug offenses (Block & Block, 1993), indicating that contact and common space are variables that deserve further explanation with regard to the occurrence and spread of gang violence.

Additionally, gang-related homicides, such as drive-by shootings are considered to be predatory offenses, in which mobility is only required on the part of the offender, and the victim's space is essentially invaded (Tita & Griffiths, 2005). Movement into the victim's space (e.g. their home, neighborhood, or turf) by the offender could be one possible explanation as to how gang homicides begin expanding into new nearby neighborhoods. While gangs typically cluster in disadvantaged neighborhoods, the actual turf or "set space" they claim is its own sub-neighborhood phenomena (Tita et al., 2005). The set space areas tend to have more renter-occupied and substandard housing, a lower ratio of adults to children and a higher ratio of residents in a lower income bracket than in other neighborhoods. The neighborhoods experiencing higher rates of gang-involved homicides are typically highly disadvantaged and socially disorganized, as is more common in Hispanic neighborhoods, as opposed to chronic poverty, which is more often associated with black neighborhoods (Tita et al., 2005). None of the characteristics associated with high concentrations of youth gangs are exclusive to urban areas, suggesting that if

these conditions are met in areas beyond city limits, the problem of gang violence can take hold.

While a fair portion of the diffusion literature is dominated by the hierarchical and contagion paradigms, the purpose of this study will not be to test the two models. As hierarchical diffusion discusses spread as a function of city size and communication, spatial contagion explains it as the result of proximity. The two mechanisms are difficult to detangle when studying modern phenomena because of markedly improved communication between cities, and the high correlation between proximity to an urban hub and population. Both models make theoretical sense, and as they are likely related, will both inform the geographic diffusion analysis within this study.

Temporal Diffusion of Gang Homicide

In addition to detecting the patterns of gang homicide spread across cities, this paper is also interested in patterns of epidemic growth over time. Just as learning more about how violent gang activity diffuses spatially can help improve containment efforts, studying temporal patterns can help to identify and respond to the problem earlier on. Again, temporal characteristics of diffusion refer to the epidemic's timeline in a single location, and tend to include four distinct phases: incubation, expansion, plateau, and decline (Golub & Johnson, 1997). Recognizing and addressing violent gang activity when it initially begins becoming problematic could both decrease the overall scope of the issue, and prevent it from diffusing elsewhere.

Because there is little research on temporal epidemic patterns of gang homicide, it is unclear whether it is an appropriate framework; however certain

characteristics of gang violence suggest that it could be a good fit. One of the major characteristics of an epidemic is a dramatic, sudden increase in incidence; given the retaliatory nature of gang violence, and consequential snowballing of violence that follows an initial incident, this model seems appropriate. This epidemic model was interpreted on a smaller scale when Decker (1996) analyzed peaks and valleys of gang violence in St. Louis between 1990 and 1993. Decker explained the fluctuations in violence with a seven step model that consisted of: loose bonds to the gang, collectively interpreting a threat from a rival, rallying (not necessarily through violence), increasing activity, violent incident, swift de-escalation, and lastly retaliation. This supports Loftin's (1984) explanation of homicide clustering, which suggests that contagion of violent crime is typically the product of an initial incident followed by subsequent acts of retaliation. It also coincides with other data from St. Louis, Missouri for the years 1985-1995, which revealed that gang-related homicides tended to be retaliatory in nature (Kubrin & Weitzer, 2003). This finding supports the idea that the murder of a gang member lives on in the organizational memory of the gang, which is governed by its own set of norms, and enforces its own street justice system (Papachristos, 2006).

The present study will specifically be addressing temporal patterns across the state of California. This state was one of the first affected by youth gang violence and is therefore the most likely to have experienced numerous, if not all four of the epidemic phases, if the model is in fact appropriate. As the gang homicide problem spread to various regions at different times, it is also possible that different cities will

have experienced different phases, or the phases will have occurred at different times; for this reason, cities will be evaluated on a case-by-case basis.

Gang Homicide Diffusion Research Questions

The aim of the current study is to explore spatial and temporal dispersion patterns in gang homicide activity in CA generally and Los Angeles county, specifically. A cartographic analysis will determine if the expansion of gang homicide occurs in a predictable pattern, perhaps linked to population density or spatial proximity to cities, or is more random in nature. A series of descriptive trend graphs will be generated and analyzed to determine if regions with developing gang violence epidemics follow a typical temporal pattern. These tests will be performed in order to evaluate the following research questions:

Question 1: How do gang homicides “spread” geographically? Are variables such as population or proximity to a central city related to the spread of gang homicide?

Question 2: Do gang homicides follow typical patterns of incubation, increase, plateau, and decline?

Chapter 3: Data and Methods

Data

The primary data used in this study are from the Supplementary Homicide Reports (SHR), which are incident level murder cases from the Federal Bureau of Investigation's Uniform Crime Reporting (UCR) program. UCR data have been collected since 1930, and currently reflect information from approximately 17,000 law enforcement agencies. Participating departments include city, county, state, tribal, campus, and federal agencies nationwide.

Criminal homicide data are included in both the UCR Part I offenses and SHR datasets. The FBI identifies murder, non-negligent manslaughter, and manslaughter by negligence as criminal homicide; that includes anything that meets the definitions “willful (non-negligent) killing of one human being by another” or “the killing of another person through gross negligence”.⁶ SHR data do not include negligent manslaughter, justifiable homicide, or deaths related to the September 11, 2001 terrorist attacks. The Supplementary Homicide Reports are detailed incident level descriptions of each murder reported, including victim, offender, and circumstance characteristics. Circumstance characteristics, which are of interest in this study, include month and year of the offense, location (county and state), responding agency, and circumstances surrounding the incident (e.g. robbery, lovers triangle, gangland killing).

⁶ To view the entire Uniform Crime Report Handbook, see <http://www.fbi.gov/ucr/handbook/ucrhandbook04.pdf>

Due to the seriousness of homicide offenses, these data are least affected by problems of under-reporting, outscoring (due to the hierarchical rule), or downgrading, which tend to plague other crime related statistics (Mosher et al, 2002). Continued participation and consistency are encouraged as the FBI provides monthly uniform tally sheets to all local law enforcement agencies. While the number of reported homicides is accepted as being quite accurate, the classification of homicide circumstances is left to the discretion of officers, which can lead to inconsistencies both intra- and interdepartmentally.

Fox and Swatt Dataset

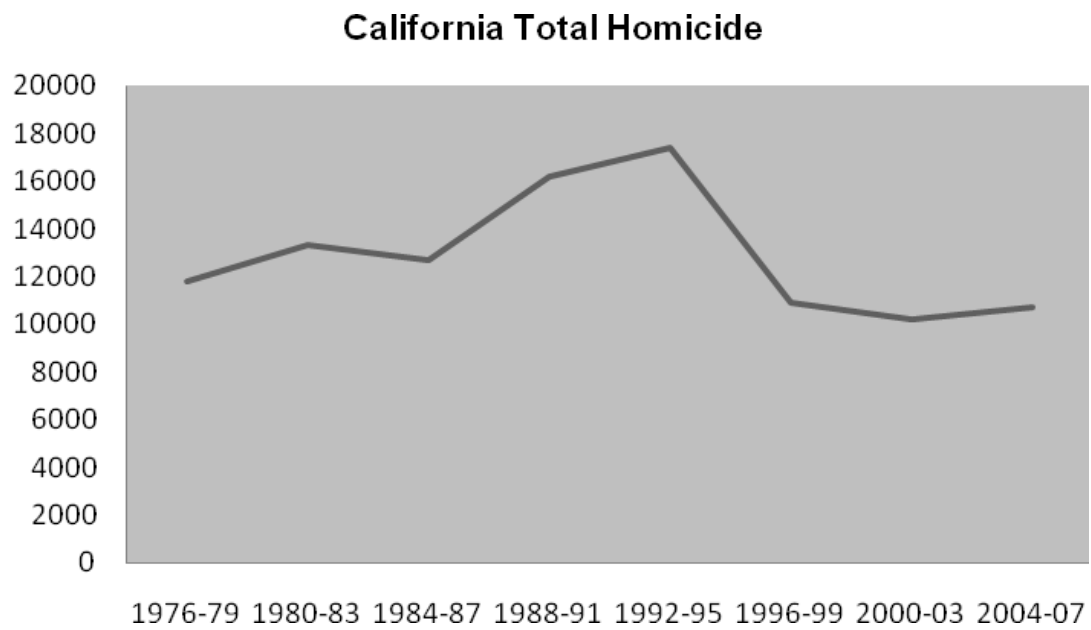
The dataset that will be implemented in this study, “Uniform Crime Reports [United States]: Supplementary Homicide Reports with Multiple Imputation, Cumulative Files 1976-2007” was developed by James A. Fox and Marc L. Swatt. The data encompasses thirty-two years of homicide data across all fifty states and Washington, DC. During the thirty-two year period covered by these data, 632,017 homicides were reported; of these, 480,007 identified the circumstances of the incident, with “other arguments” as the mode (n=181,663). Homicides were reported for all fifty states and the District of Columbia, and across all years during the time frame, with the highest occurrence of murder reported in 1993 (n=26,116).

This study focuses on data for California, which reported 16.4% (n=103,393) of all of the homicides in the SHR for the 1976-2007 period. Within the state of California, individual regions are identified by the variable “agency name”, as there is no individual city or town variable within the SHR data. For the years 1976-2007,

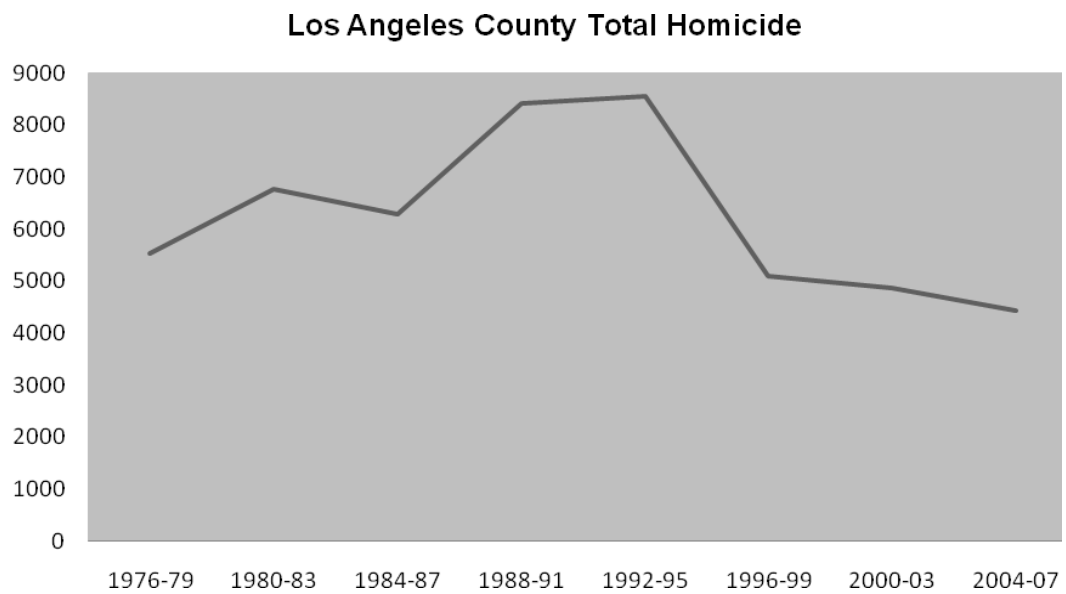
288 different agencies reported at least one gang related homicide, with 188 reporting ten or fewer over the thirty-year period.

Consistent with the national data, homicides of all circumstances also peaked in California in 1993 (n=4,649), and by 2007 were back down to 2,501, a total even lower than 1976 levels (see Graph 1). One third of all of California's homicides for the 32 years of data took place in the city of Los Angeles (n=33,419). Following Los Angeles, the next highest city, San Diego, accounted for only 3.9% of California homicides (n=3,984), suggesting the Los Angeles is truly an outlier. Los Angeles County reported a total of 49,936 homicides during the 1976-2007 period (see Graph 2), which is nearly half of all incidents in the state of California. Of the 87 cities within the county, 37 reported over 100 homicides while four cities (Compton, Los Angeles, Inglewood, and Long Beach) each reported over 1,000. In addition to city, state, and year, the SHR data also indicate the circumstances surrounding the homicide, if known.

Graph 1: California Homicide Across Time, In Four Year Increments



Graph 2: Los Angeles County Homicide Across Time, In Four Year Increments



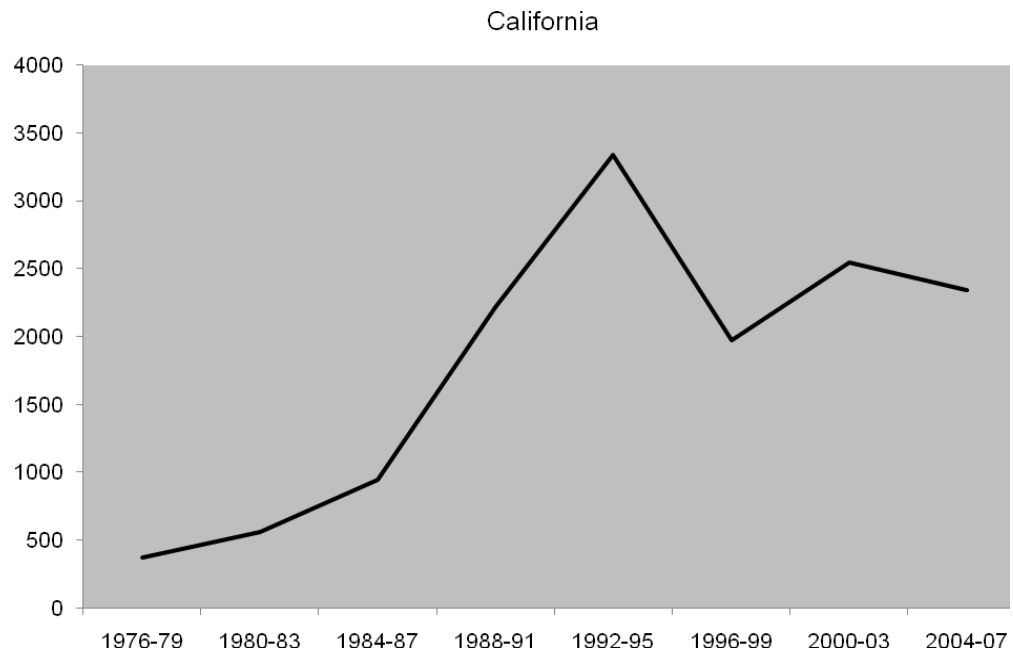
Gang Homicide Circumstance Variable

The Supplementary Homicide Reports circumstances variable includes a “youth gang killing” measure⁷. Youth gang killings comprise 5% (n=24,133) of all reported homicides for the time period. When looking specifically at the state of California, youth gang homicides make up 20.1% (n=14,277) of all murders in the state between 1976 and 2007. Within this time frame 1976 (n=61) and 1977 (n=70) were the only years in which California reported fewer than 100 gang related homicides, with the average number at 446 per year. Similar to total homicide figures for both the United States and California, the peak years for gang homicides in California were 1993 through 1995, when there were over 800 gang homicides for each of the three years (see Graph 3).

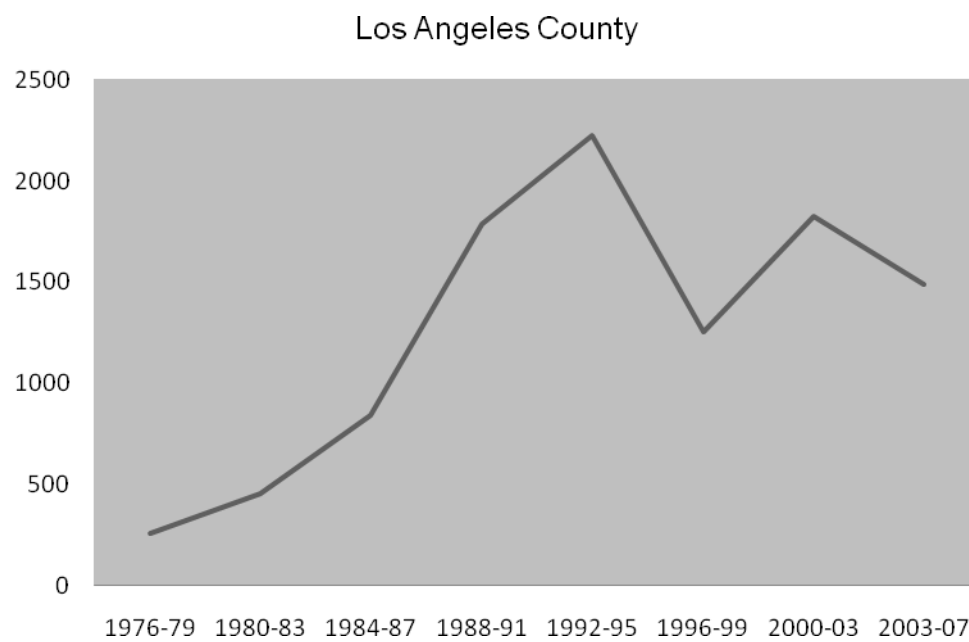
Los Angeles County reported a total of 10,266 gang homicides between 1976 and 2007, encompassing the majority (72%) of all gang homicides in the state of California 6,857 gang homicides were reported in the city of Los Angeles during the time period, with the next closest city in volume within the LA County limits being Compton (n=684). The peak years for Los Angeles County were 1991-1994 when more than 540 incidents were reported each year, with the most deadly year being 1994 (n=603) (see Graph 4). .

⁷ The Supplementary Homicide Reports also include a variable called “gangland homicides”. These cases were not included in the study as they refer to racketeering, corruption, and other organized crime situations. For the 32 years studied, there were 216 “gangland homicide” cases in the state of California.

Graph 3: Gang Homicides in California Across Time, In Four Year Increments



Graph 4: Gang Homicides in Los Angeles County Across Time, In Four Year Increments



Geographic and Population Density Variables

As previously stated, this will be a case study of California and Los Angeles County. California reported gang homicides consistently across time and location, without major gaps; this could be due to the fact that the state has one of the oldest gang problems and more experience in recognizing and coding related events. Additionally, by including a single state, this will hopefully circumvent the problem of different definitions of gang homicide that has prevented meaningful comparisons across states.⁸ This study will employ two main datasets in an attempt to capture meaningful geographic and demographic information; gang homicide location information will come from the UCR, whereas city-level population information will come from the California Department of Finance. Data from the CFA will be used rather than the SHR population information, as SHR data are incident level and do not include any information for cities that did not report homicides. The Department of Finance population estimates are reported on an annual basis for each city within every county, including Los Angeles County.

Geographic Information System Analysis

To address the research question concerning geospatial dispersion of gang homicide, a Geographic Information System (GIS) analysis will be implemented. GIS is a computer mapping software that allows for the simultaneous mapping of multiple variables across geographic planes. Each variable is transformed into a

⁸ Still, data for one state are not without potential limitations. The UCR applies loose definitions to its gang homicide variables, giving individual agencies discretion in determining which events qualify. As definitions can change over time, caution should still be applied when studying a single state over time.

“layer”, which can be added or removed from the map image at any time. Layers can indicate landmarks, as well as variable densities and frequencies by using pinpoints, shapes, color gradients, and icons.

Two separate GIS analyses will be performed: first a general analysis of gang homicide spread in California, followed by an in depth look at dispersion patterns in Los Angeles County. The longitudinal spatial analysis across the state of California will contain 32 individual maps displaying variation across the years 1976 through 2007. Maps will be assessed on a year to year basis rather than in multiple year increments, so that short term trends or fluctuations will not be overlooked. Homicide frequency will be represented by a color based density gradient, where different colors represent a certain range of homicides for the given time period. Maps will be arranged in four year increments, displayed across eight panels so that large changes across time are easily identified, and clearly displayed. Maps for each individual year analyzed will be included in an appendix.

The second GIS analysis will focus specifically on Los Angeles County. Los Angeles County was chosen as the target of this focused analysis because it has the oldest, most concentrated, and most consistent gang homicide problem of any region in California; additionally, Los Angeles County has a clear city center from which gang homicide could diffuse, and distance could be measured. This map will be different, not only because of the tighter resolution and focus, but because it will include a layer that reflects the population density of the cities and towns contained within the county. Population density will be represented by a scaled color gradation, which will indicate approximately how many people inhabit particular areas. The

maps will be displayed in four year blocks across 8 panels, with maps for each individual year in an appendix. Two additional eight panel images will also be created to show what contagion and population based diffusion would ideally look like in Los Angeles County. If spatial contagion of gang homicide is taking place in Los Angeles County, then the scaled symbols representing homicides should diffuse outwards from Los Angeles city in a wine stain pattern, with higher frequencies (larger symbols) occupying the center of the “stain”. If population based diffusion is taking place, then gang homicide incidents would spread from areas with the highest populations to subsequently less inhabited areas across time.

In order to supplement the visual analysis of the Los Angeles County maps, numerous correlation coefficients will be calculated and compared. In a fashion similar to a traditional panel study, Los Angeles County cities will be studied across the 32 year period. Cities that reported zero gang homicides across the 32 year period (n=14) will not be included in the correlation analysis, as they do not appear to be at risk for developing a gang homicide problem. For each year, two correlations will be calculated individually: the relationship between gang homicide frequency and population size, and gang homicide frequency and distance from the city Los Angeles.⁹ If one of the variables correlates more strongly with frequency of gang homicide than another across the 32 years, then it is likely a better indicator of how this epidemic has spread across Los Angeles County. As it is expected that both proximity and population are related to diffusion, with gang homicide spreading to less populated or more distant cities over time, the correlations are not expected to

⁹ Because the most specific information provided regarding incident location is city, distance will be measured as the amount of space between city centers.

remain static from 1976 to 2007; this analysis is meant to supplement the visual assessment of the second set of maps and indicate if one of these variables is more strongly related to the number of gang homicide incidents than the other.

Descriptive Trend Graph Analysis

The second research question will be addressed through the use of descriptive trend graphs. If gang homicide epidemics follow the typical four phase patterns described in other literature, then the gang homicide frequencies should illustrate these patterns over time. Graphs will include an X-axis measuring “Year (1976-2007)” and a Y-axis measuring “Reported Gang Homicides”. These will be created for cities and towns showing substantial increases in gang homicides across time, indicative of an epidemic. Cities will be chosen based on two criteria: first, cities must have experienced at least 32 homicides, averaging at least one incident per year studied. Of the cities with the minimum number, they must have no recorded instances of gang homicide for the first two years studied (1976, 1977), in order to ensure that some form of growth will be captured. Twenty-seven cities meet these criteria and will be analyzed. If the epidemic phases do take place for gang homicide dispersion, then the trend should indicate a low frequency incubation period, a phase of rapid increase, plateau, and finally a decrease to a level of steady carrying capacity.

Additionally, temporal trend graphs will also be generated for Los Angeles County and California state, measuring total homicides, and total gang homicides across the thirty two year period. These four graphs should create a picture of the overall trends in Los Angeles County and California as a whole, as well as display if

changes in gang homicide patterns reflect fluctuations in overall homicide rates in general.

Data Limitations

As previously stated, this study will be an analysis of Los Angeles County and the State of California due to the long history and consistent reporting of gang violence in the region. However, the Supplementary Homicide Reports and California region create some limitations that will be addressed in this study, but still mean that the results should be generalized to other regions or to the national level.

One limitation of the SHR dataset employed in this study is that it only contains homicides for the 1976-2007 time period. It is well documented that the city gang problem in the United States predates 1976 by at least half a century (Hagerdorn, 1998), so clearly these data do not include the entire history of the epidemic. Despite this shortcoming, the 32-year timeframe implemented in the research does encompass the peak for gang homicides on the national, state (California), and county (Los Angeles County) levels.

Additionally, as the SHR data is incident level, it only indicates where a gang homicide took place, rather than where gangs actually exist; there is no way of distinguishing from this level of data if the offenders traveled to a location where the crime occurred, or if it was just a rare episode of violence from an otherwise docile gang. As this data only reveals where gang homicides—which are considered to be a rare event—take place, a larger diffusion trend involving gang presence or activity, might be missed.

Another issue to be considered is that California gangs, particularly those in the Los Angeles County region are characteristically different from urban gangs in other major cities such as Chicago, Boston, or New York. Los Angeles gangs identify as primarily Chicano or African American have existed for over fifty years, developing territory and subcultural norms in that time (Vigil & Yun, 2002). The gang subculture in the Los Angeles region includes its own rituals and routines, as well as an age-graded culture in which older gang members remain involved as role models to new recruits (Vigil & Yun, 2002). As each region in the United States has different demographic compositions and cultural norms, it would be highly unlikely for Los Angeles gang violence diffusion characteristics to be generalizable to the entire country. As a result, this analysis of this study will not attempt to draw conclusions about other regions, but rather increase knowledge and understanding of the gang epidemic in California (Los Angeles County, in specific). The national implications of this study may come in the form of the replication of this analysis in other cities.

Chapter 4: Results

Geographic Diffusion Analysis

The California State analysis is quite simplistic and straightforward. A single map was constructed for each of the 32 years within the dataset (1976-2007). Each map depicted the number of gang homicides for each city or county using a color-coded scale (cities that did not report any incidents were left white). Each color identified a particular range of gang homicides, with the colors and ranges remaining consistent across all 32 years. The purpose of this analysis was to study if there were any patterns in the way gang homicide epidemics spread across the state. This analysis in particular was informed by the spatial contagion theory of diffusion, with the purpose of identifying if gang homicide in fact spread in a radial “wine stain” pattern over time.

The 32 California maps indicated that gang homicides typically appear in a sporadic fashion, popping up for single years at a time, rather than diffusing centrally and “sticking” in this formation, as would be expected with spatial contagion. In this study “sticking” refers to a city experiencing a gang homicide problem for a number of consecutive years, rather than only a few instances intermittently distributed across the 32-year window. Gang homicide rarely ever occurred in northeastern California, and when there were reports of incidents in that region there was no sticking, or instances reported the following year. One aspect among the GIS analysis that was consistent with contagion was that the central urban hub, Los Angeles, experienced gang homicides during each of the 32 years, even as the epidemic was occurring elsewhere.

When looking at the state of California as a whole, gang homicides did not spread to the majority of cities, as demonstrated by Image 1. When it was indicated on a map that a gang homicide had occurred in a city during a certain year, it was almost always in the “one to five” range. 1991 was the year when homicides appeared to begin sticking, with homicides increasing in frequency and density across the early 1990s; this sticking did not display any evidence of a “wine stain” pattern, as would be expected with spatial contagion. Increased density of homicides was indicated by the shifting of the color gradient; from 1976 until the early 1990s almost all cities reporting gang homicides indicated one to five, but during the early 1990s in particular some cities began reporting higher frequencies. By 1997 almost all cities reporting gang homicides in California returned to the one to five range.

The examination of gang homicides in Los Angeles County is similar to that in California state, but ultimately provides a more detailed analysis. Like the state level analysis, 32 individual maps were created, each of which represents a year studied. In this case each city is color-coded based on population, regardless of whether a gang homicide occurred that year. Population data were obtained for each year for every city, so the population color will not be consistent for each city across the 32 years. Gang homicides are represented by a graded yellow circle, which changes in size depending on the number of homicides in a particular city. The purpose of adding the population variable is to observe if gang homicide epidemics spread according to city size, (i.e., to see if cities with high populations are typically affected before cities with lower populations).

Image 1: Eight Panel Illustration of California Gang Homicide and Population Data in Four Year Increments From 1976-2007

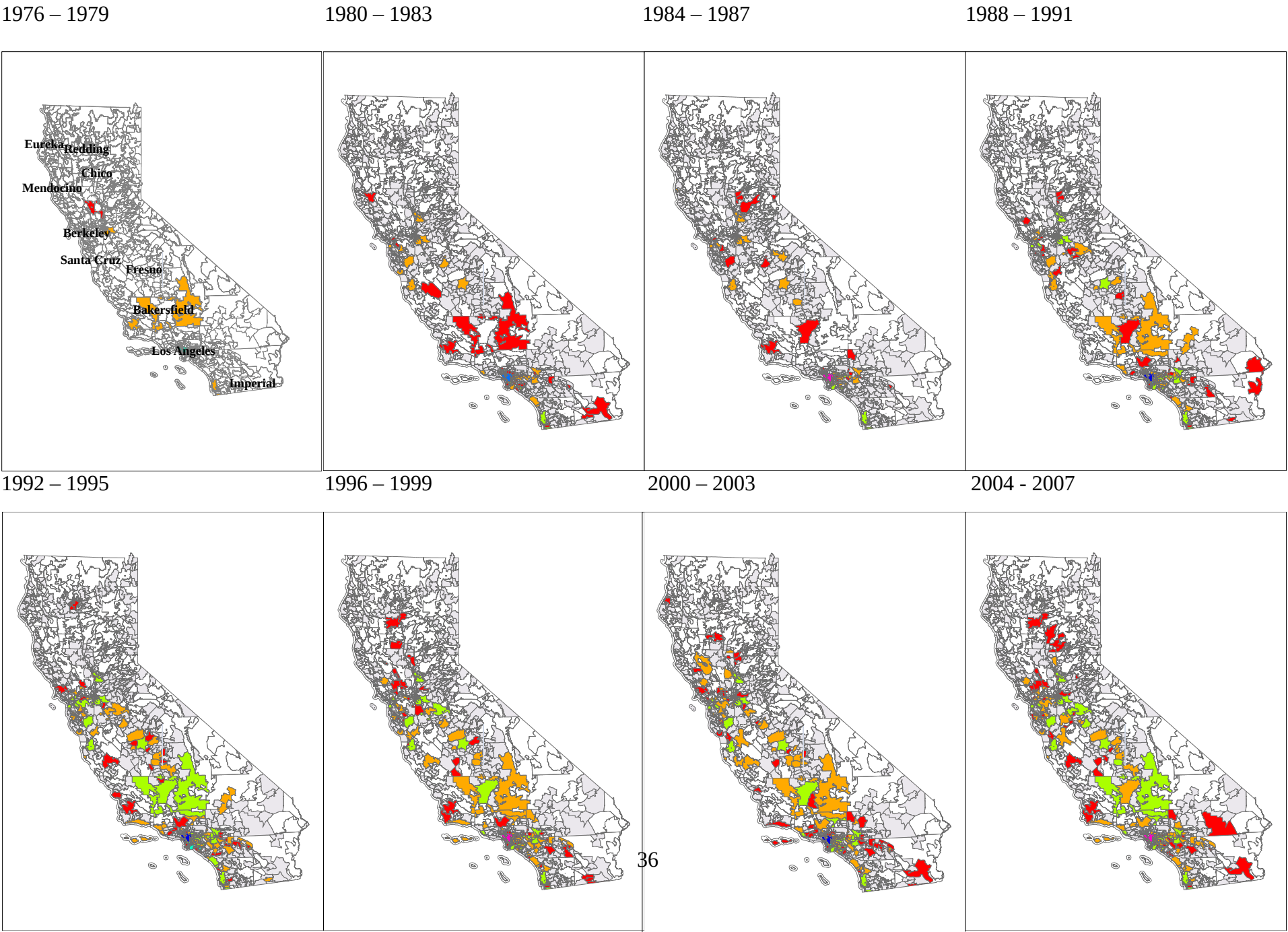


Image 2: Eight Panel Hypothetical Illustration of Los Angeles County Gang Homicide and Population Data in Four Year Increments if Population-Based Diffusion Were Occurring

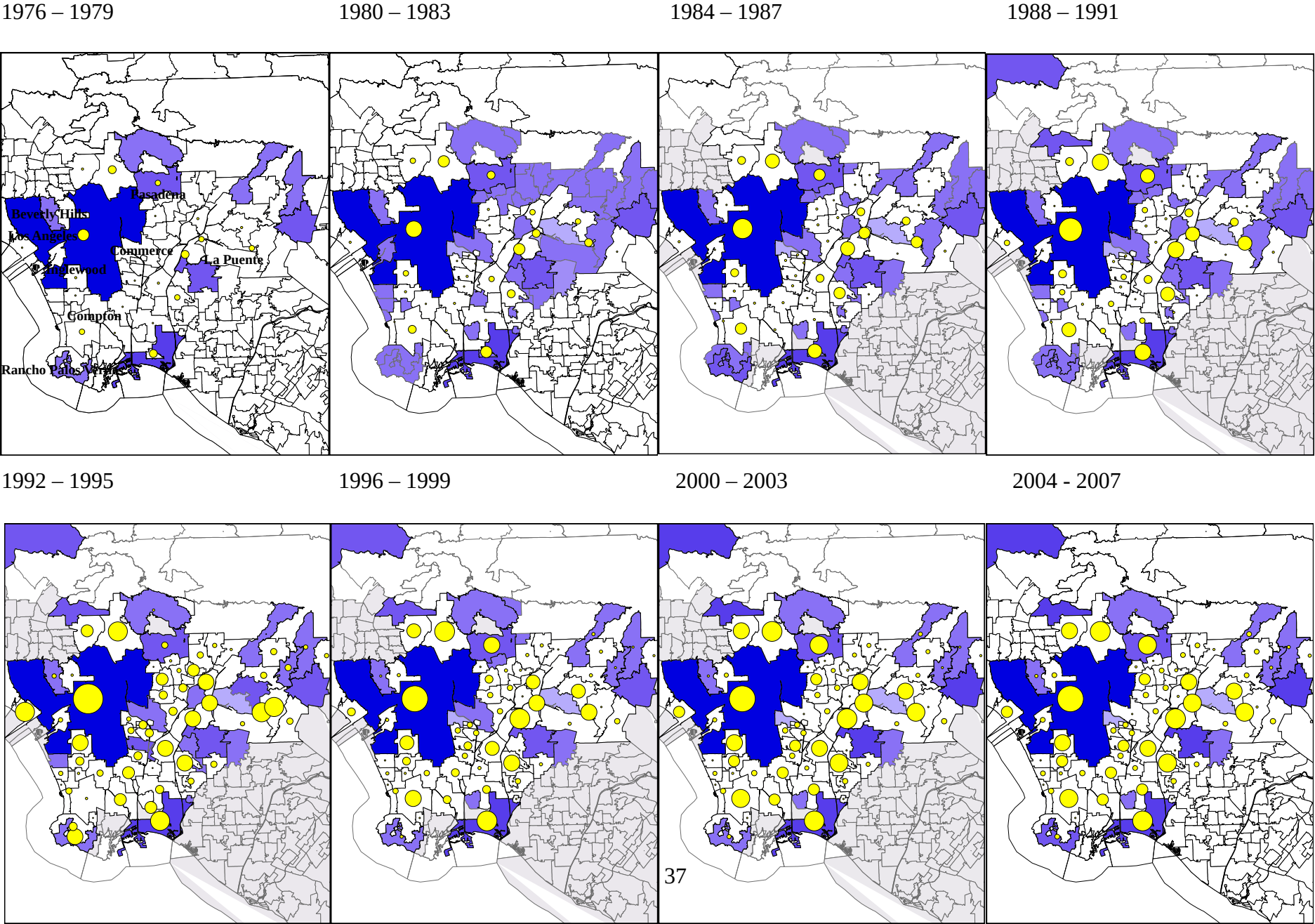


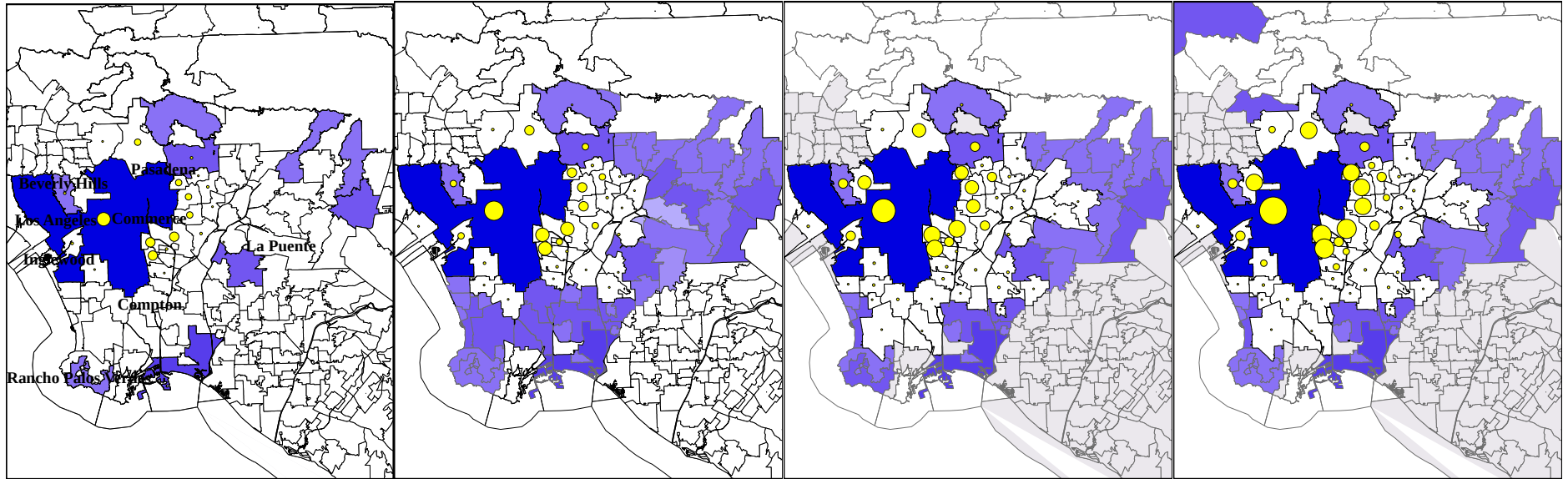
Image 3: Eight Panel Hypothetical Illustration of Los Angeles County Gang Homicide and Population Data in Four Year Increments if Typical Spatial Contagion Were Present

1976 – 1979

1980 – 1983

1984 – 1987

1988 – 1991



1992 – 1995

1996 – 1999

2000 – 2003

2004 - 2007

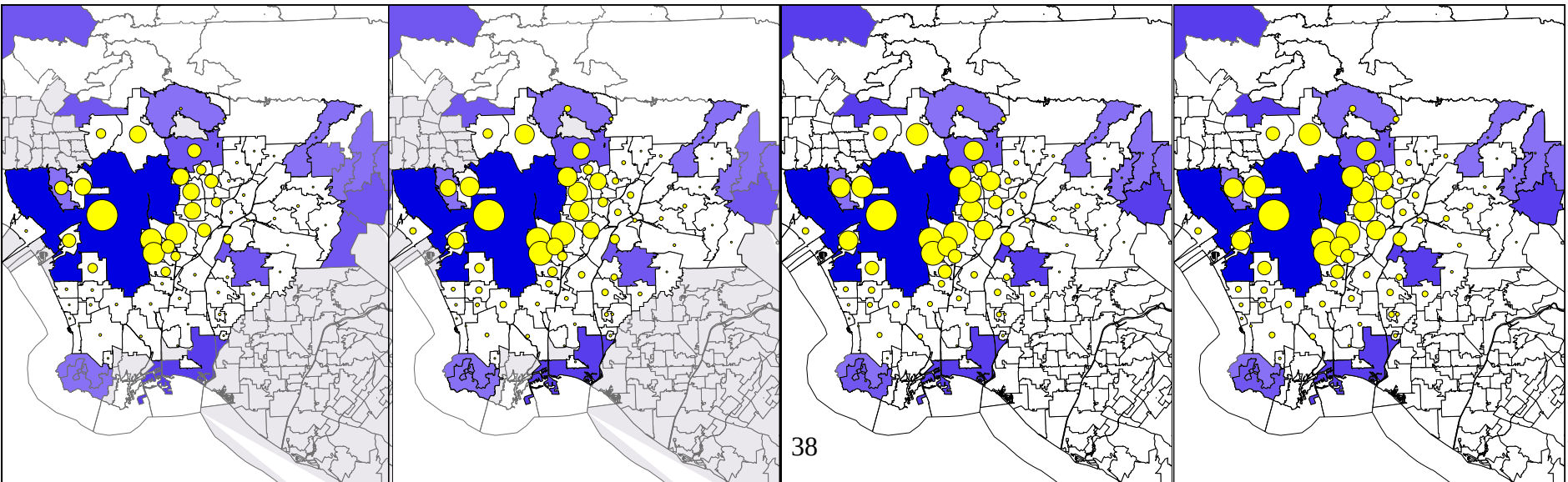


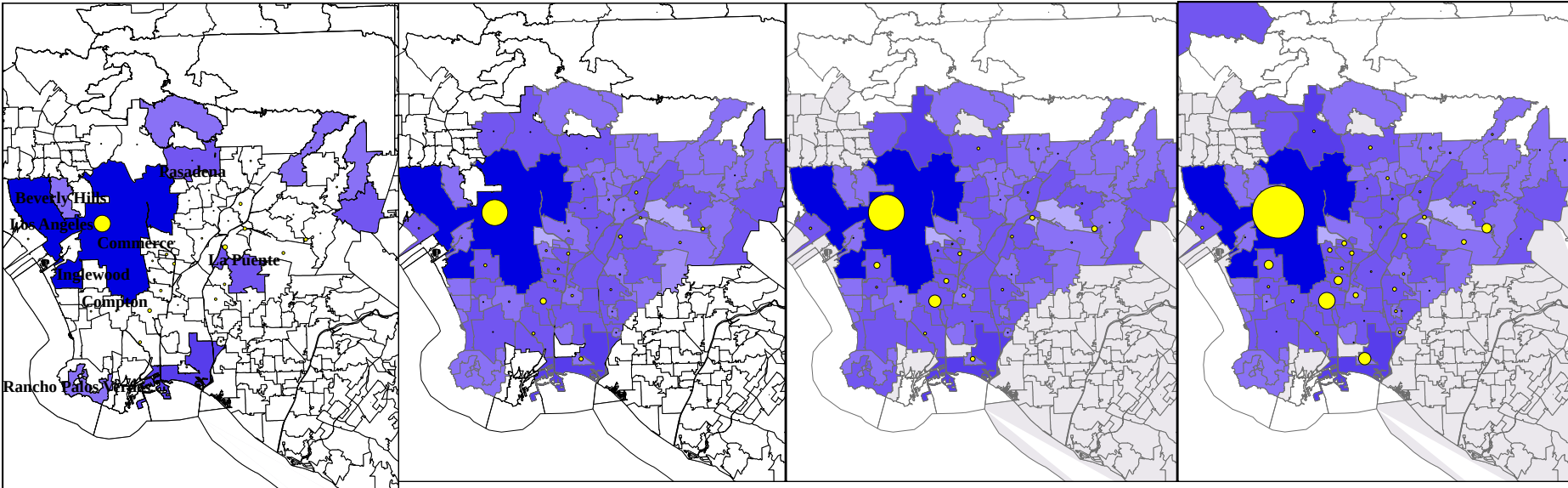
Image 4: Eight Panel Illustration of Los Angeles County Gang Homicide and Population Data in Four Year Increments

1976 – 1979

1980 – 1983

1984 – 1987

1988 – 1991

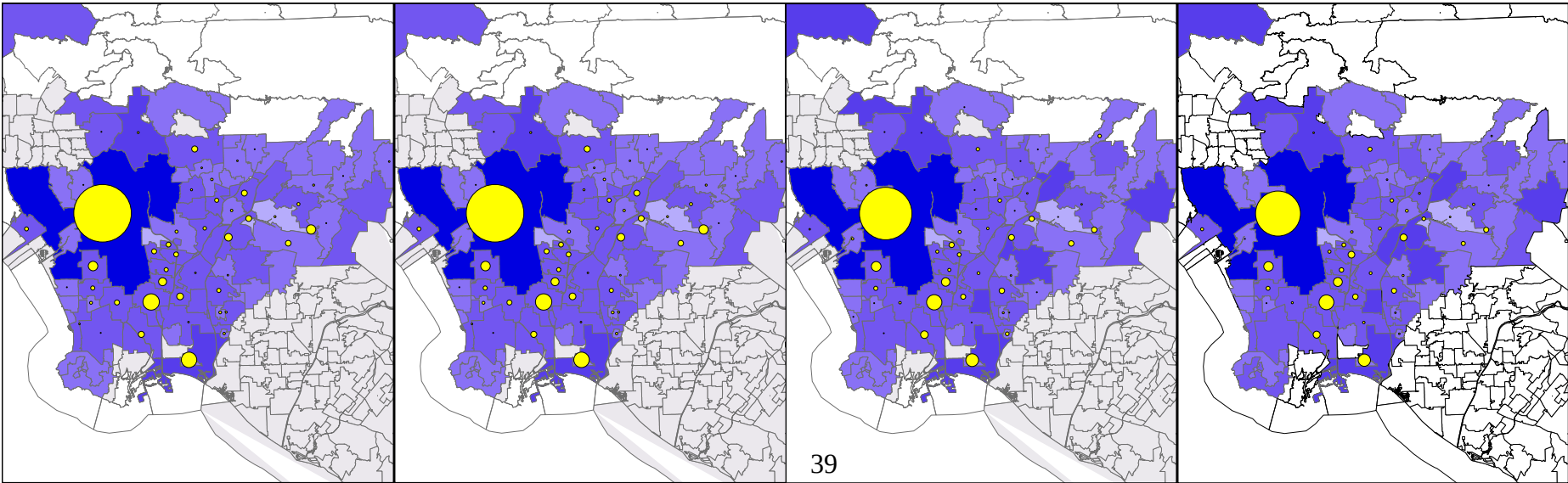


1992 – 1995

1996 – 1999

2000 – 2003

2004 – 2007



This analysis is supplemented with three series of 32 correlations; the correlations will measure (1) the relationships between population and number of gang homicides, (2) distance from Los Angeles and number of gang homicides, and (3) population and distance from Los Angeles. The purpose of the correlations is to measure if one variable has a stronger relationship with the gang homicide frequency than another.

If population based diffusion of gang homicides were taking place in Los Angeles County, the correlation values would be high, positive numbers, as areas with higher populations would experience more incidents; over time the correlations—though still positive—would weaken, as gang homicides spread to less dense regions. If spatial contagion is taking place, then the correlation values between distance from Los Angeles City and number of gang homicides should be strong but negative, as cities closer to the epicenter would be expected to experience higher levels of violence. Over time these values should remain negative but weaken, as the problem spreads out to areas further away from Los Angeles. The third pairing, population and distance from Los Angeles, is calculated to measure the relationship between the two variables, and to assess if it has changed over time.

The eight panel figure (Image 4) of Los Angeles County suggests that population and location of gang homicides are not related. The more heavily populated a city is does not appear to be related to whether or not gang homicides will occur there prior to less populated areas. The distribution pattern of the actual SHR data on the map does not resemble the pattern displayed by hypothetical data displaying population-based dispersion in Image 2. Unlike the hypothetical population-based figure, the real data in Image 4 indicate that many of the darker

regions (implying high population) did not experience any gang homicides in the 32 year period, while some of the lighter areas did¹⁰. Correlation values for city populations (not including Los Angeles) and number of gang homicides were calculated for each year from 1976 through 2007 (Table 1, Appendix 1). While the correlation values did not increase consistently over time, they do reveal an overall positive trend (Graph 6, Appendix 1). The weakest value was 0.0752, which occurred in 1976, the first year observed, and the highest correlation was 0.7418 in 1993. Over the course of the 32 years studied, the relationship between population and number of gang homicides strengthens, peaking during the year when the highest number of homicides occurred. This makes sense in relation to the maps, as during the year of peak homicides, occurrences also appeared to be widely dispersed, and occur in more of the higher populated regions than less violent years.

Proximity to the central city did appear to be related to spread, but only for cities and towns southeast of Los Angeles (Image 4). Unlike in the proposed “ideal” depiction of spatial contagion (Image 3), the actual SHR data revealed gang homicides to be quite rare in cities north of Los Angeles, with the epidemic never establishing itself or “sticking” anywhere in the region. During the 1990s, which were when gang homicides peaked in both Los Angeles County and the state of California, cities close to southeast Los Angeles appeared more likely to experience gang homicides, but proximity to the city did not seem to be related to the overall number of gang homicides experienced. 1989 appears to be the first year where gang

¹⁰ Individual year-to-year maps of the Los Angeles County geographic analysis can be found in Appendix 3.

homicides appear widely across Los Angeles County, with incidents increasing in frequency in cities other than just Los Angeles.

As would be expected, not all cities are at equal risk for experiencing incidents of gang homicides. Thus, one could argue that the likelihood of seeing a more stereotypical spatial diffusion would be limited to adjacent areas displaying risk factors for gang activity and homicide. A closer inspection of the targeted region of Los Angeles County, southeast of Los Angeles City (Image 5), reveals diffusion occurring in an approximate “wine stain” fashion. Homicides tend to focus immediately around the urban epicenter, and consistent with all of Los Angeles County, and California, peak during the 1992-1995 period. However, unlike the ideal contagion spread depicted in Image 3, while distance does appear to be related to whether or not gang homicides occur in some locations, it does not seem to be related to frequency.

Correlation values for a city’s distance from Los Angeles and number of gang homicides were also calculated for each year from 1976 through 2007 (Table 1, Appendix 1). The correlation values displayed a gradual positive shift over time, with a number of fluctuations along the way (Graph 7, Appendix 1). The most negative correlation was in 1978 (-0.0566), and the most positive was in 2007 (0.0170), when the only positive correlation occurred.

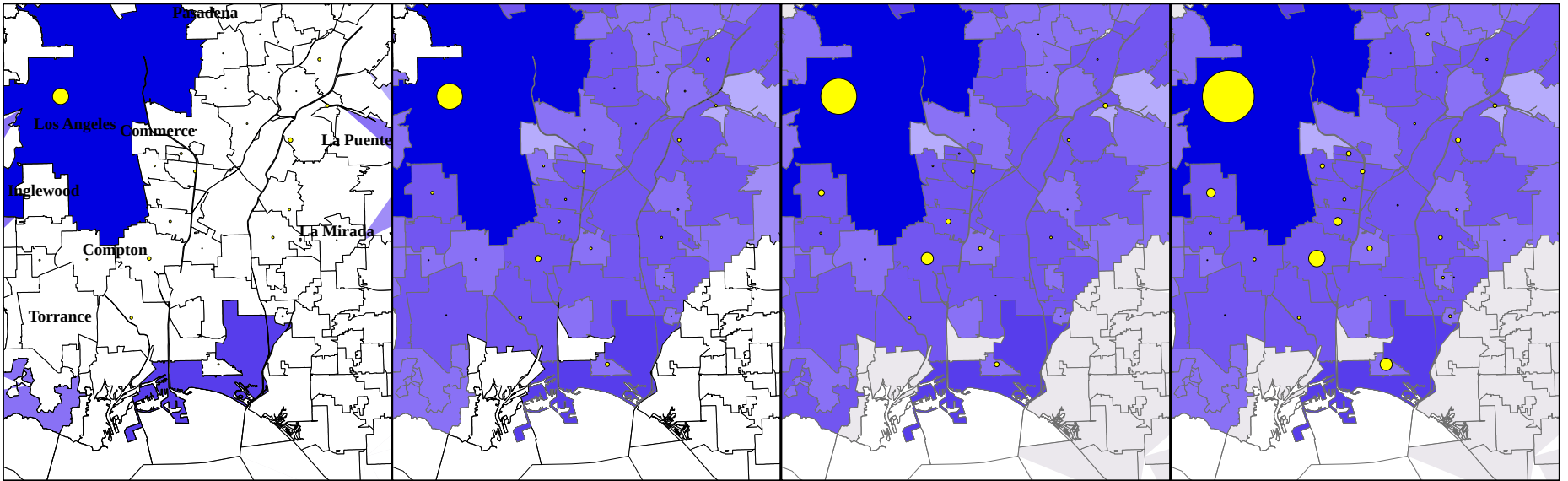
Image 5: Close-Up Eight Panel Illustration of Southeast Los Angeles County Gang Homicide and Population Data in Four Year Increments

1976-1979

1980-1983

1984-1987

1988-1991

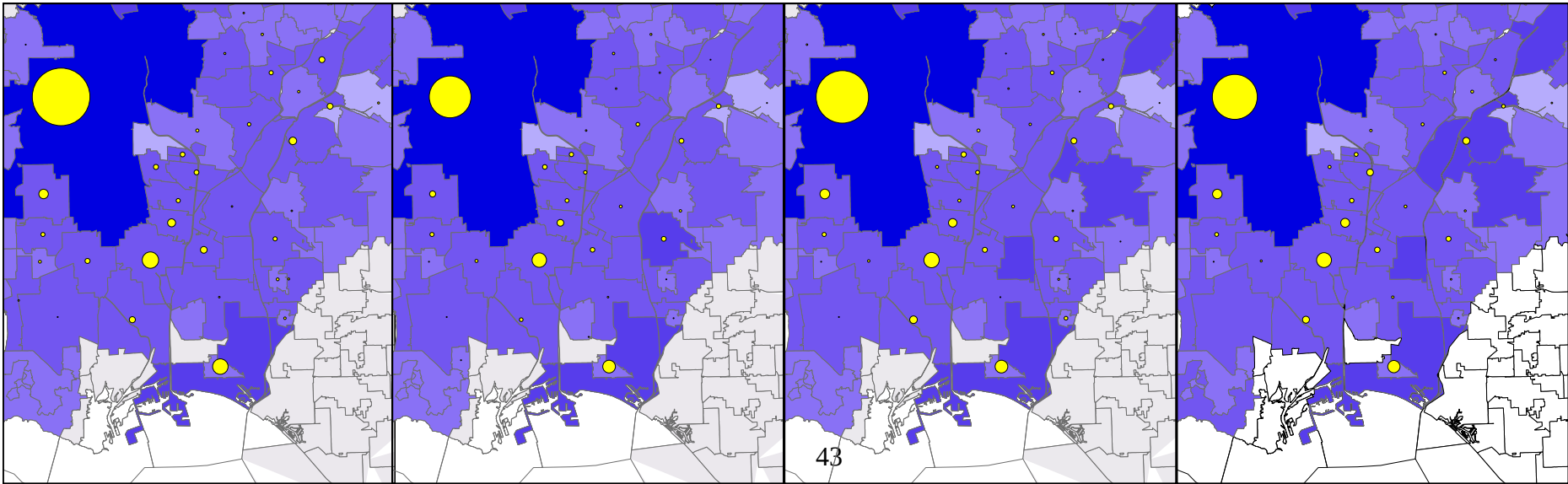


1992-1995

1996-1999

2000-2003

2004-2007



A third correlation, measuring the strength of relationship between the two variables of interest, was also calculated for each year (Table 1, Appendix 1). This correlation was calculated in an attempt to learn more about the overlap between the two variables, and how much covariation occurs amongst them. This relationship decreased in magnitude, while becoming more positive across the 32 years, with the strongest value in 1981 (-0.1350) and the most positive value in 2007 (0.0259)¹¹ (Graph 8, Appendix 1). As the distance from Los Angeles was consistent over time, but population values changed every year, this suggests that over time distance from the central city was less likely a predictor of high population; eventually this relationship even becomes positive, although it is extremely weak, suggesting that some cities further out might actually have larger populations than cities relatively closer to Los Angeles.

Temporal Diffusion Analysis

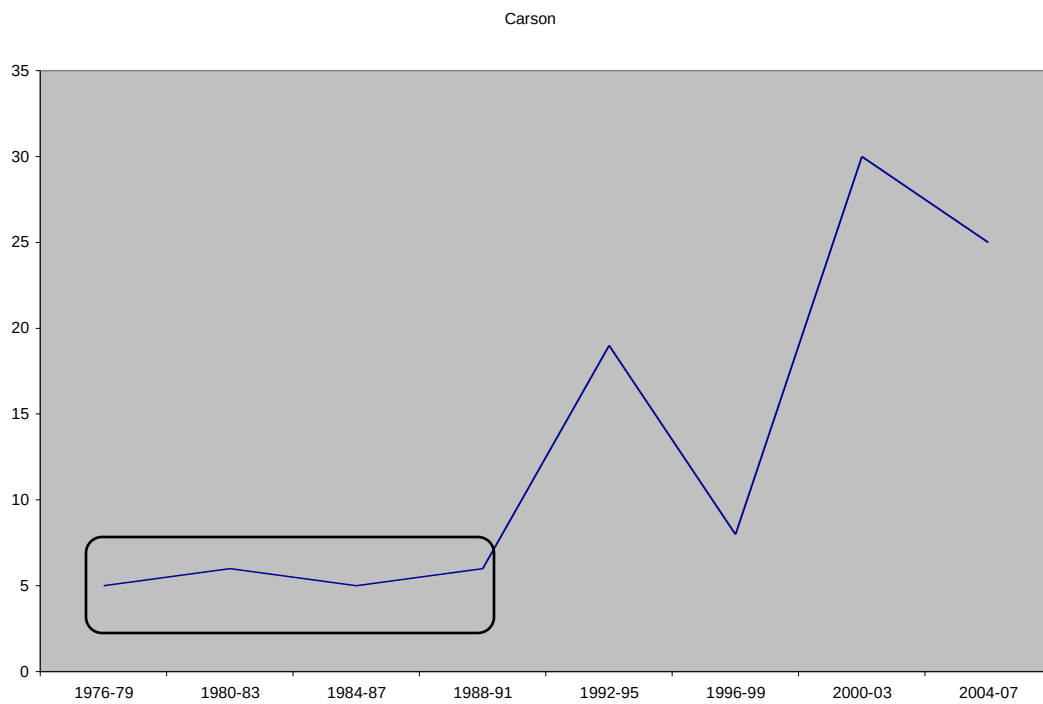
The second part of the analysis examines if there is a uniform lifecycle for the gang homicide epidemic in California. Specifically this is attempting to identify if there are four specific phases, earlier identified as incubation, increase, plateau, and decline. Cities within the state of California were chosen for inclusion in this analysis based on two criteria: cities had to have over 30 gang homicides during the time period studied, as to average more than one per year and ensure some variance, and the cities had to report zero gang homicides for the first two years studied, in order to increase the likelihood that the beginning of the trend was captured. Among all of the cities in California, 32 met these criteria.

¹¹ Unlike with the correlation between distance and number of homicides, this correlation value was positive for the last eight years observed

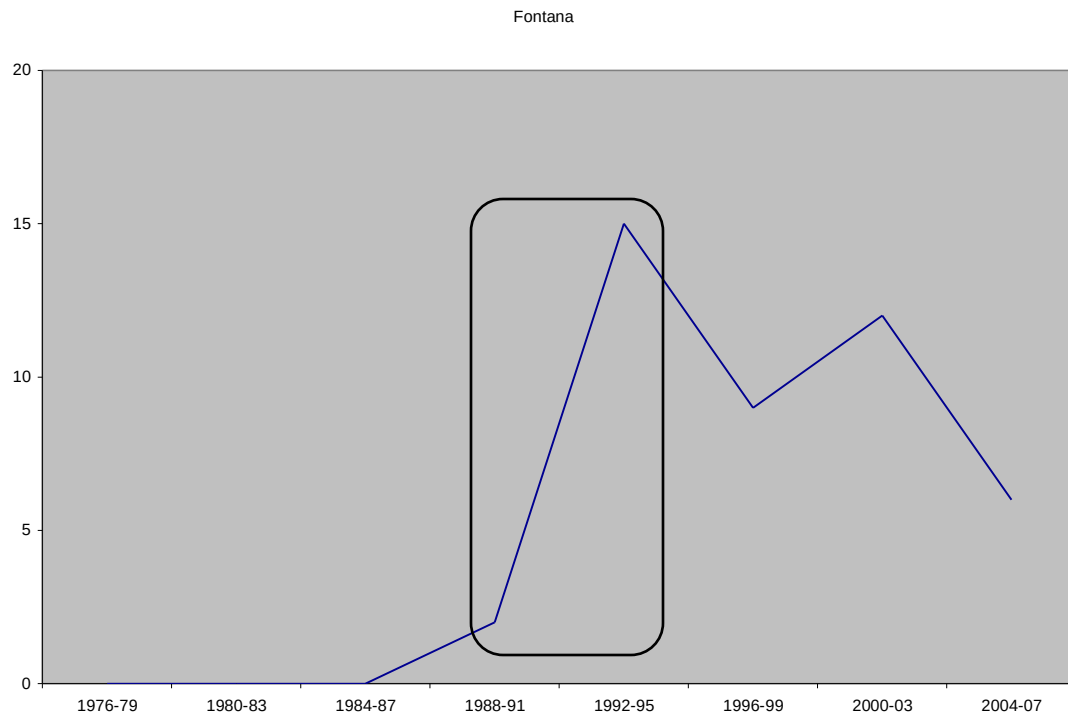
Graph 5: Typical Four Phase Epidemic Distribution



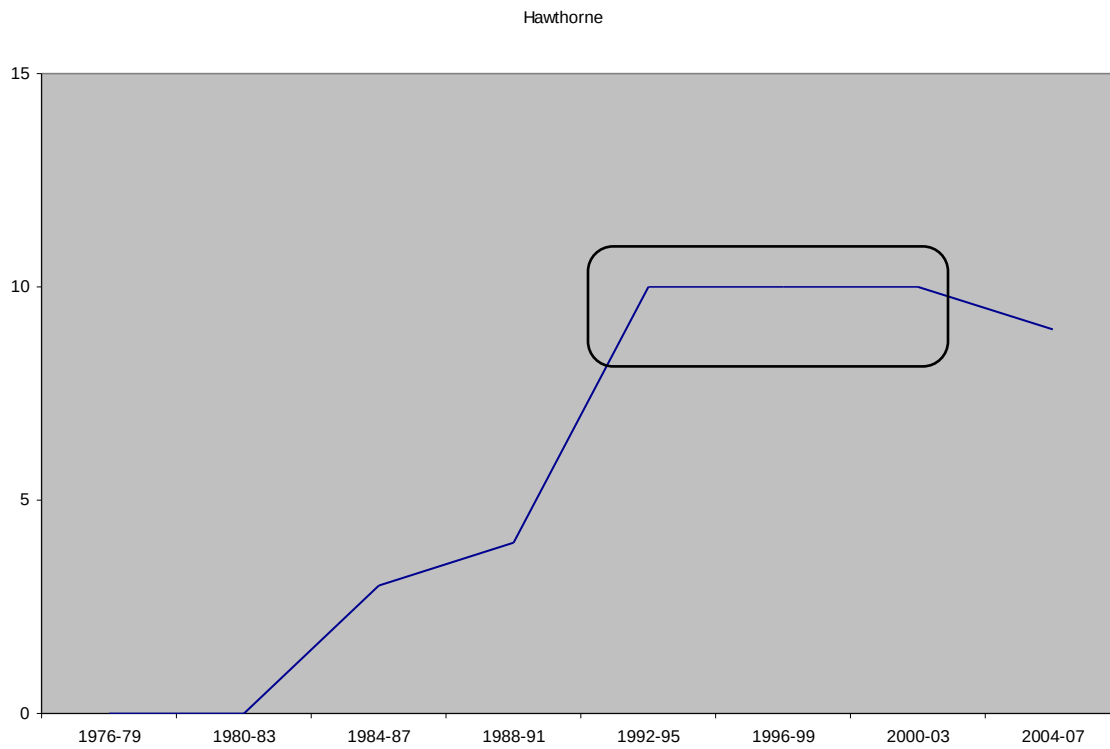
Graph 6: Typical Incubation Phase of an Epidemic, as Experienced by the City of Carson, California



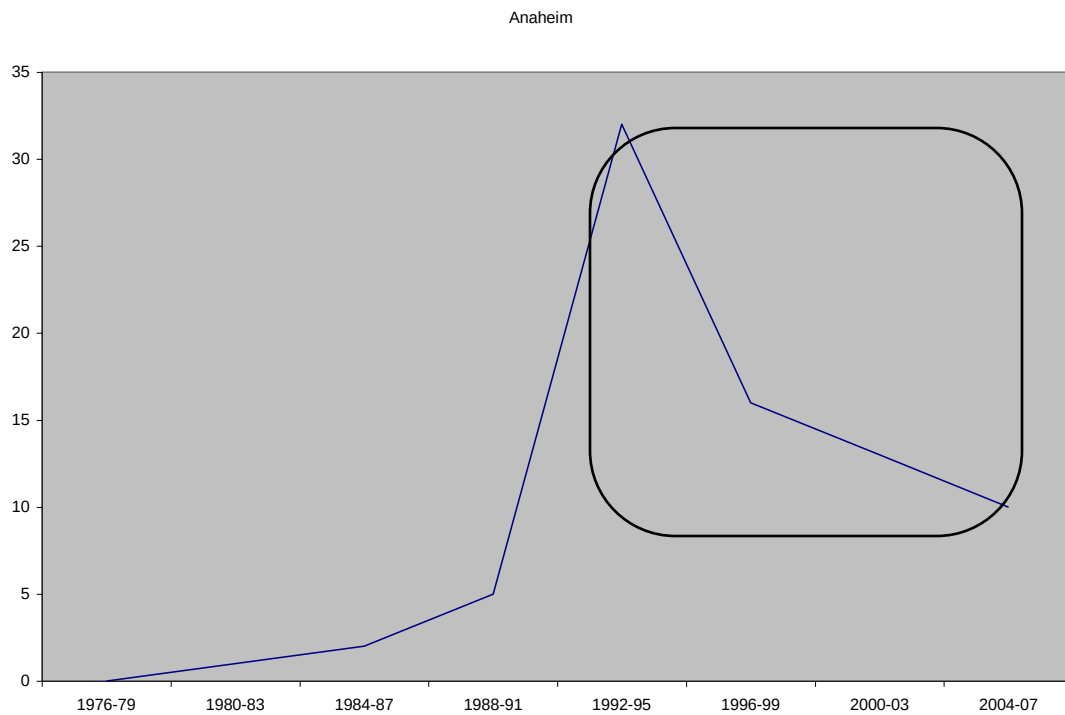
Graph 7: Typical Increase Phase of an Epidemic, as Experienced by the City of Fontana, California



Graph 8: Typical Plateau Phase of an Epidemic, as Experienced by the City of Hawthorne, California



Graph 9: Typical Decline Phase of An Epidemic, as Experienced by the City of Anaheim, California



A typical four phase epidemic graph would have a low constant value for a few years during the incubation phase (Graphs 1 and 2), a sudden spike during the increase (Graphs 1 and 3), followed by a leveling off during plateau (Graphs 1 and 4), and eventually a drop off during decline (Graphs 1 and 5). Almost half of the cities observed (15) displayed only one of the four typical epidemic phases. Nine cities reported two phases, seven reported three, and one city displayed zero of the four phases. No city that met the inclusion criteria displayed all four epidemic phases.

Fifteen of the 32 cities analyzed showed evidence of an incubation phase within the data. Increase was the most common phase, with 25 of the 32 cities displaying a single, sudden swell in gang homicide incidents. Plateau was the least common of the four phases, with only three cities showing any leveling off following the peak in homicide activity. Decline was also fairly uncommon, with only about one third (11) of cities displaying a drop off in homicide numbers toward the latter portion of the study period¹².

Analysis of the four more generalized trend graphs, tracking homicides and gang homicides in Los Angeles County and California revealed trend lines more consistent—though still not entirely—with the four phase model. Total homicides in both Los Angeles County and California displayed nearly identical trend graphs (Graphs 9 and 10, Appendix 4). Interestingly, the one phase that was not clear across the 32 years of homicide data for the two regions was the dramatic increase. Given that homicide is in no way a new phenomenon, the relatively stable values from 1976-1987 should not be mistaken for an incubation period.

¹² As data was unavailable for years preceding 1976, some relevant information is potentially missing, thus these trends should be interpreted with some caution.

Los Angeles County and California State also display nearly identical trend lines for gang homicide data, although this is expected, as Los Angeles is responsible for the majority of California's gang homicides (Graphs 11 and 12, Appendix 4). Additionally, the trend lines for both regions were quite similar across total and gang specific homicides. From "1976-1979" to "1984-1987" both graphs of all homicides showed relative stability, while the gang homicide trend increased gradually. From "1998-1991" to "1992-1995" all four graphs showed increases, though it was far more dramatic with gang homicides. Following the increasing trends, all four graphs displayed a dramatic drop off in the number of incidents reported; all homicides then gradually declined for the remainder of time studied. Gang homicides experienced a slight increase between "1996-1999" and "2000-2003", but then also experienced a gradual decline.

Chapter 5: Discussion

This thesis aimed to contribute to the knowledge regarding how gang homicide trends diffuse geographically and temporally. By pictorially displaying 32 years of data, this study aimed to uncover novel patterns and information that could contribute to gang homicide literature and policy. The findings, while limited in their generalizability, should increase understanding as to how violent epidemics diffuse, and stimulate new questions for future research.

The geographic analysis of California state elicited two important findings: overall gang homicides seemed to appear sporadically throughout the state, and most cities' gang homicide problems began to "stick" and increase around the same time. While this particular level of the analysis did not take population or other variables into account, it presented a color-graded visual display of gang homicide activity across thirty-two years. This depiction showed very limited evidence of gang homicide epidemics diffusing in a radial wine-stain pattern, indicating spatial contagion. The sporadic appearance and disappearance of gang homicide activity in assorted cities throughout the state thus suggests that a spatial contagion model would not be appropriate for explaining statewide spread of gang homicide.

Although gang homicide incidents did not appear to disperse in any sort of uniform pattern at the state level, it did appear that gang homicide problems began "sticking" in cities around the same time. For the majority of the time frame analyzed, gang homicides would be reported in a city for a particular year, but then not again the following year, creating what appeared to be a sporadic "popcorn" effect when observing the series of 32 maps. However, in the early 1990s gang

homicides began to “stick” in certain cities, appearing for a number of consecutive years, with some cities even reporting increases in frequency.

Both the national and California peaks in gang homicides were in 1993, with California experiencing over 1,100 more gang homicides from 1992 to 1995 than the combined four years preceding or following that period. This indicates that despite a lack of physical proximity, cities affected by gang homicide epidemics predominately experienced their years of peak violence at the same time. This finding suggests that while physical closeness may not be necessary for an epidemic to spread, some form of communication is most likely occurring, leading to the synchronization of the peaks. In the case of the communication and spread of ideas with regard to gang homicide, various media such as television, music, movies, and more recently the internet and social networking sites could be to blame. While the cities in California affected by gang violence appear to be widely dispersed, they all typically share certain demographic characteristics, such as social disorganization, high immigrant populations, or high concentrations of youth, making them particularly vulnerable to these epidemics.

Similar to the California State analysis, the Los Angeles County cartographic and correlation analyses indicated that gang homicide does not explicitly follow one particular dispersion pattern across the region. There was some support for proximity-based spread, but only for cities southeast of Los Angeles. Few areas within the county boundaries located north of Los Angeles ever experienced gang homicide incidents, with none ever displaying dramatic growth over time. Additionally, observations from the GIS analysis did not suggest that the frequency of

gang homicides correlated with proximity to Los Angeles for cities to the southeast, just whether or not they occurred at all. The correlation values measuring the strength of the relationship between the distance from Los Angeles and number of gang homicides fluctuated across time but showed an overall positive trend that became less negative (weaker) across time. With the exception of the last year of the analysis, all of the distance-homicide correlations were negative values. Over time proximity to Los Angeles City was no longer related to the frequency of gang homicides (displayed by correlation values of nearly 0.0), indicating that homicides were occurring in a more dispersed geographic area. However, while the decreasing strength of the correlation values does correspond with what would be expected from spatial contagion, these values cannot measure if the expansion is taking on a “wine stain” shape, which the GIS analysis finds, it does not. The decreasing strength of the distance-gang homicide correlation supports the idea that over time gang homicides are less centralized. However as the correlation value within this series with the strongest value is quite weak itself (-0.2265 in 1980) the overall change is less impressive.

Similarly, there do not appear to be noticeable differences in population density for cities affected by gang homicide, both north and south of Los Angeles. The associated correlations, which attempted to measure the strength of relationships between population and number of gang homicides, fluctuated across the 32 years studied, but revealed an overall positive trend. If population-based dispersion were to exist, the correlation values would most likely exhibit positive values to start, and then become weaker or even negative over time, as gang homicides spread to less

populated areas. The correlations were the highest during the peak years of the epidemic, particularly 1992 and 1993; by 1994 the correlation dropped from 0.7418 to 0.5274. These findings indicate that cities with large populations were more affected by the early 1990's peak in gang violence than less populated cities, while during years with fewer gang homicides, the correlation between population and gang homicides was also lower. What this seems to suggest is that for the most part there is a fairly weak relationship between population and number of gang homicides; however, during times of epidemic peaks, large cities appear to be more affected.¹³

Two variables that were not included in this study but are quite likely related to a city's susceptibility to gang violence are income levels, and racial and ethnic diversity. If one or both of these variables were related to where gang violence epidemics travel it would support a cultural, concentrated disadvantage argument. Information from the 2000 United States Census indicates that within Los Angeles County, the range of average incomes for cities north of Los Angeles is about \$39,914-70,945, while for cities south and southeast of Los Angeles the range of average incomes is \$28,941-58,214. While no scientific conclusions may be drawn from these simple observations, important information could be obtained by studying the relationship between gang homicide spread and average income more closely. Similarly, information from the 2000 Census also indicated that cities north of Los Angeles have less diversity than cities south of Los Angeles. Areas north of the city

¹³ The correlation values between population and distance also experienced a general increasing pattern over time, with the first 25 years observed displaying a negative relationship, and the last eight years positive. Because distance from Los Angeles remained a constant value over the 32 years studied, the changes in correlation reflect fluctuations in individual city populations. This suggests that over the course of the 32 years studied, a long distance from the central city was less likely to indicate that a particular city had a small population. Eventually this relationship even becomes positive, although it is extremely weak, suggesting that some cities further out might actually have larger populations than cities relatively closer to Los Angeles.

reported approximately 13.6-56.4% of their individual populations as being non-white, while cities south of Los Angeles reported 37.3-83.3%. As was the case with income, this also supports an idea that socio-demographic factors can probably help explain the spread of gang homicide epidemics, but should be studied more methodically before any conclusions are drawn. Overall, these findings do suggest that proximity may play a role in the dispersion of gang homicides, and is most likely influenced by variables not considered in this study.

The geographic analysis presented in this study had a number of inherent limitations that could be largely responsible for the lack of a clear diffusion pattern. The geographic diffusion models used to inform this study have, in past research, primarily been used to investigate public health related issues, such as the spread of disease—a phenomenon that assumes all people are at equal risk. The problem with applying a public health centered model to a social epidemic such as gang violence is that prior research has already found that susceptibility to this risk is not uniform; rather, it is influenced by a multitude of structural and cultural factors. Assuming that a strong population or distance based pattern would appear would arguably be ignoring the underlying individual differences that distinguish each city. However, there are two reasons to suspect that this is not solely responsible for the results. First, though a focused review of areas south and southeast of LA City—arguably the area’s most “at risk” for gang homicides—revealed a pattern relatively more consistent with spatial diffusion, it was not fully consistent. Second, the state of California uses the criterion of being “gang related” in order to identify gang homicides, meaning that in order to be labeled as a gang homicide one of the parties involved must be a gang

member—the crime itself does not necessarily have to be gang motivated. For this reason, more cities are potentially at risk for experiencing gang homicides than it may appear at first blush (i.e., these cities need not be at risk for a clear gang presence for mobile gang members to commit crime in their jurisdictions). This definitional issue could explain why areas beyond southeast Los Angeles that do not display the same risk factors for gang violence reported experiencing sporadic incidents across time.

In addition to how gang homicide problems spread across California, this study was also interested in learning more about how the epidemic unfolded across time in individual cities. The temporal diffusion analysis portion of this study was specifically intended to examine if there are set phases within the course of a gang homicide epidemic. Trend graphs for 32 cities that met the previously stated inclusion criteria were compared against a model graph with all four phases. This comparison did not yield evidence in support of a uniform four phase epidemic model. The only phase that appeared to be consistent in almost every case was “increase”, a sudden and dramatic spike in the number of gang homicide cases, which was experienced by 78% of cities in this analysis. This extremely high rate of increase is likely in part due to the sampling process, which involved capturing cities with at least one homicide per year, and none the first two years; given the way cities were selected, increase was more likely to be observed than if they were simply chosen at random. The other three phases were each represented inconsistently, all of which occurred in less than 50% of cities.

Cohen and Tita (1999) define epidemics as a period of rapidly accelerating growth followed by a period of decline. While only one third of cities studied

revealed a clear decline phase in the latter portion of years observed, even fewer showed signs of a plateau. It is possible then, that if the trend graphs studied were to be extended a few years beyond 2007 that cities would begin to show signs of decline; while gang homicide peaked in 1993, perhaps the real decline back to zero has yet to begin. Another possible explanation for the lack in decline is the nature of Los Angeles gang culture. When Golub and Johnson (1997) introduced the idea of a decline phase in crack use, they explained that it occurred because young people were not replacing former users. As intergenerational gang membership is more common in cities with established gang problems, particularly in the Los Angeles and Chicago regions (Howell et al, 2002), it is possible that new generations of gang affiliated families prevent drastic decline from taking place. While it is only possible to speculate about why increase is the only phase supported by this research, there is enough evidence to conclude that a four-phase model is not appropriate for gang homicide activity in Los Angeles. The individual city epidemics studied here instead appear to be defined by a sudden, dramatic increase in gang homicides but no other uniform temporal patterns. Additionally, the similar trends in gang and total homicides across time suggest that the number of gang homicides in an area could be related to the overall amount of violent crime—a notion that requires further investigation before any clear conclusions may be drawn.

Both the geographic and temporal analyses brought forth new knowledge to the discussion of gang homicide. This information could be used to edify policy and develop preventative programming, particularly in the Los Angeles region. As most of the conclusions drawn from this study are themselves sheathed with more

questions, the policy implications are not clear-cut. The desultory fashion by which gang homicide incidents and epidemics seemed to appear across the state of California raised questions about possible communication between cities that might lead to the spread of the problem. Further investigation as to how violent gangs might be using media, such as the internet or social networking sites, that might influence followers or copycat groups in distant locations, could aid containment efforts. Additionally, as the spread of gang homicide does appear to be quite haphazard, cities with high populations of youth, and other risk factors associated with gang prevalence in earlier research, should be targets of gang prevention and awareness procedures, even if not physically proximate to a gang violence epicenter, such as Los Angeles. As this research has demonstrated, geographic propinquity to an urban hub with an existing gang homicide problem is not essential for a region to experience the phenomena itself.

The findings from this study have raised additional research questions that remain to be answered: Why do gang homicide epidemics in geographically isolated regions peak at the same time? What characteristics exist southeast of Los Angeles that makes the region more susceptible to gang violence than north of the city? Why aren't cities in California experiencing decline in gang homicide frequency as rapidly as they experienced increase?

Guided by these lingering questions, future research regarding the diffusion of gang homicide epidemics may be approached in a number of different ways. Localized analyses of individual cities affected by gang violence can uncover important situational characteristics for when the problem first arrived and when it

experienced a period of dramatic increase. Identifying these features could help increase understanding with regard to risk factors that created an environment that would welcome and nurture this type of violent epidemic. Because local law enforcement data would be most appropriate for this type of study, it would not be limited to California, and instead could be conducted on a national level, increasing both the scope and the generalizability of the findings.

In both a national study as well as the analysis of California and Los Angeles just conducted, consideration of additional variables could be useful in explaining some of the spread, and why epidemics peak at certain times. Variables that would be worth testing in future research include highway, bus, and other public transportation patterns. While particular cities and towns may appear to be sporadically located on a map, adding a public transportation layer may in fact reveal ways in which they are connected that are not otherwise obvious. Finding a link such as transportation or commuting pathways could also explain the communication that appears to be taking place between cities, and make sense of the simultaneous peaks of gang homicide epidemics.

The findings from this investigation do corroborate with the initial expectation that no individual diffusion mechanism is responsible for the way in which gang homicides expand. Geographically, there was mild support for proximity and population arguments, but the majority of variation between cities remains unexplained. Temporally, only one epidemic phase—the dramatic increase—was supported; without a clear incubation phase to precede the exponential growth, the possibility of identifying a tipping point seems less likely. Thus, while some novel

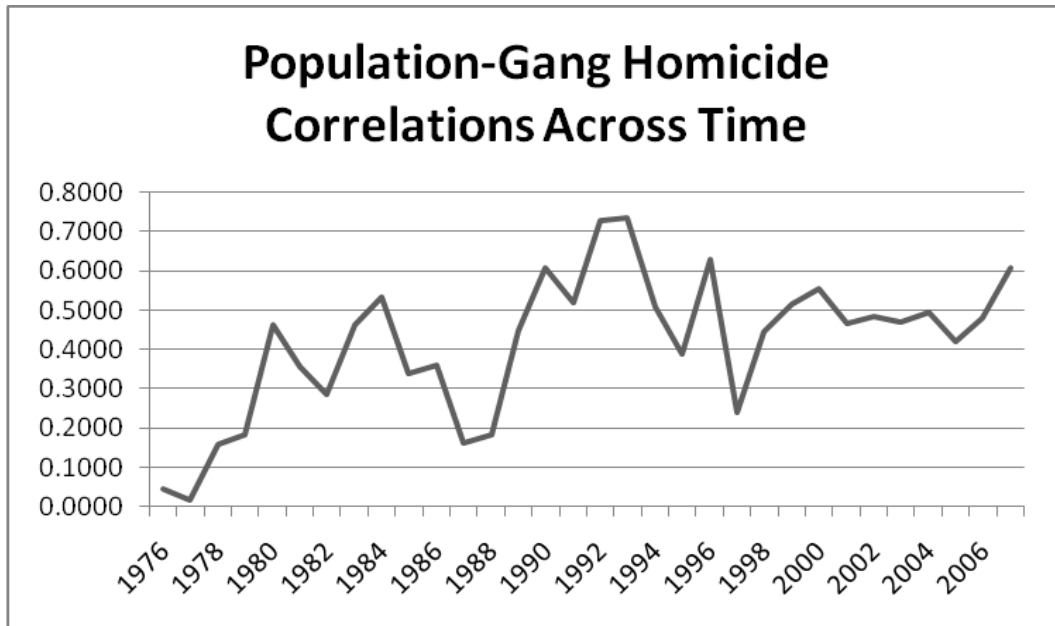
information has been acquired through this study, there is still much to be learned about the changes and diffusion of gang homicide epidemics across space and time.

Appendix 1: Correlation Results

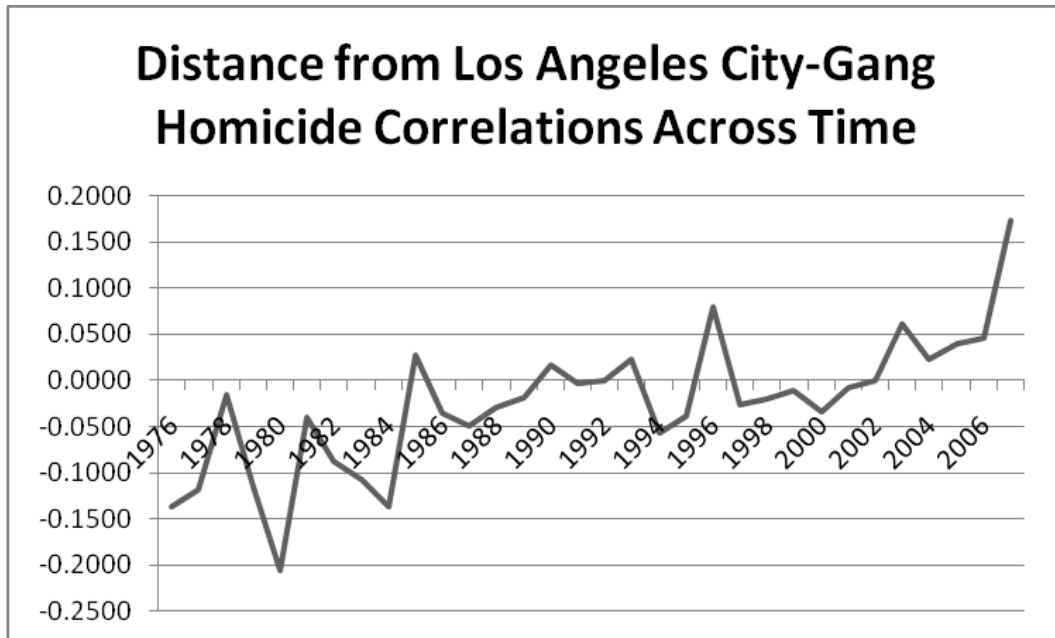
Table 1: Correlation Values for Population, Distance, and Youth Gang Homicides in Los Angeles County

Year	Population-Gang Homicide Correlation	Distance-Gang Homicide Correlation	Population-Distance Correlation
1976	0.0464	-0.1364	-0.0516
1977	0.0158	-0.1176	-0.0532
1978	0.1577	-0.0155	-0.0524
1979	0.1847	-0.1145	-0.0511
1980	0.4630	-0.2058	-0.0517
1981	0.3553	-0.0406	-0.0471
1982	0.2859	-0.0874	-0.0439
1983	0.4623	-0.1078	-0.0423
1984	0.5314	-0.1371	-0.0373
1985	0.3404	0.0276	-0.0228
1986	0.3594	-0.0356	-0.0119
1987	0.1611	-0.0487	0.0130
1988	0.1841	-0.0295	0.0432
1989	0.4487	-0.0192	0.0610
1990	0.6074	0.0160	0.0796
1991	0.5181	-0.0031	0.1005
1992	0.7286	-0.0004	0.1103
1993	0.7347	0.0230	0.1172
1994	0.5091	-0.0565	0.1332
1995	0.3866	-0.0388	0.1418
1996	0.6282	0.0796	0.1478
1997	0.2411	-0.0264	0.0401
1998	0.4453	-0.0199	0.1539
1999	0.5154	-0.0116	0.1545
2000	0.5527	-0.0336	0.1573
2001	0.4655	-0.0085	0.1603
2002	0.4851	0.0000	0.1679
2003	0.4679	0.0617	0.1666
2004	0.4947	0.0230	0.1711
2005	0.4197	0.0396	0.1785
2006	0.4797	0.0459	0.1868
2007	0.6068	0.1730	0.1966

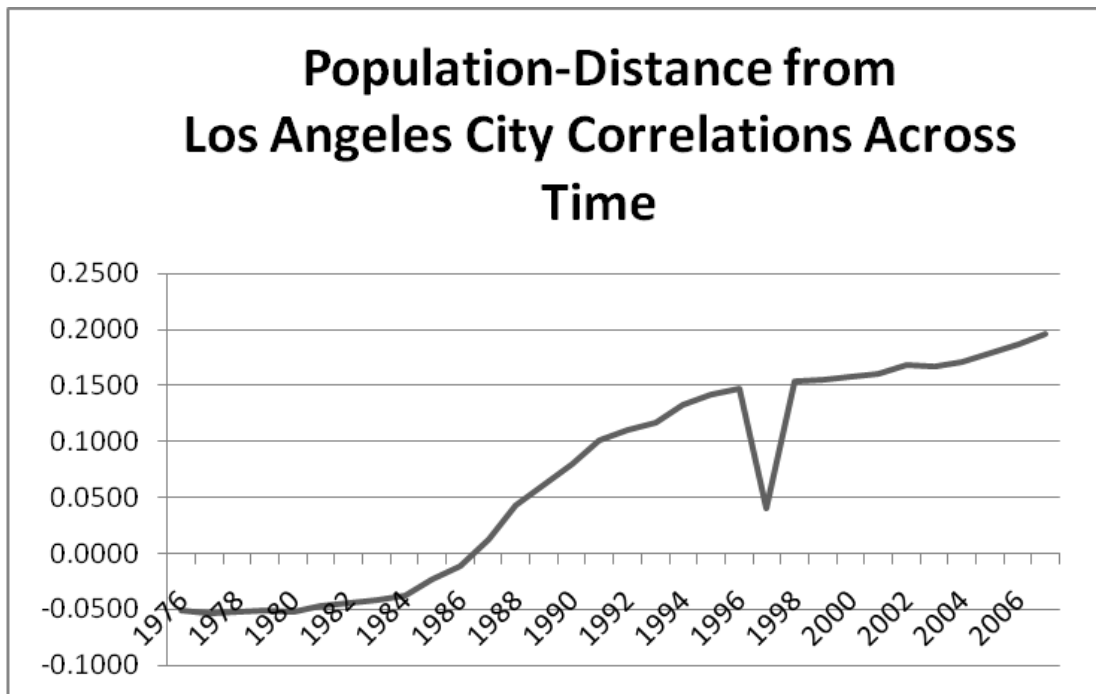
Graph 10: Correlation Values for Population and Number of Gang Homicides in Los Angeles County



Graph 11: Correlation Values for Distance from Los Angeles and Number of Gang Homicides in Los Angeles County



Graph 12: Correlation Values for Distance from Los Angeles and Population of Cities in Los Angeles County



Appendix 2: California State Geographic Diffusion Analysis

Image 6: Color Key Representing Number of Gang Homicides, Used in Geographic Information Analysis of California State

Number of Gang Homicides

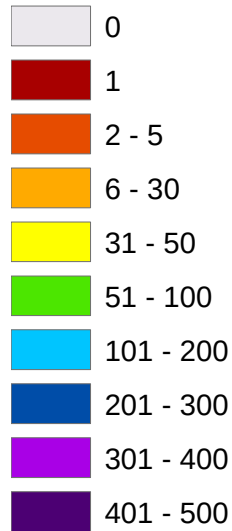


Image 7: California Cities for Geographic Reference

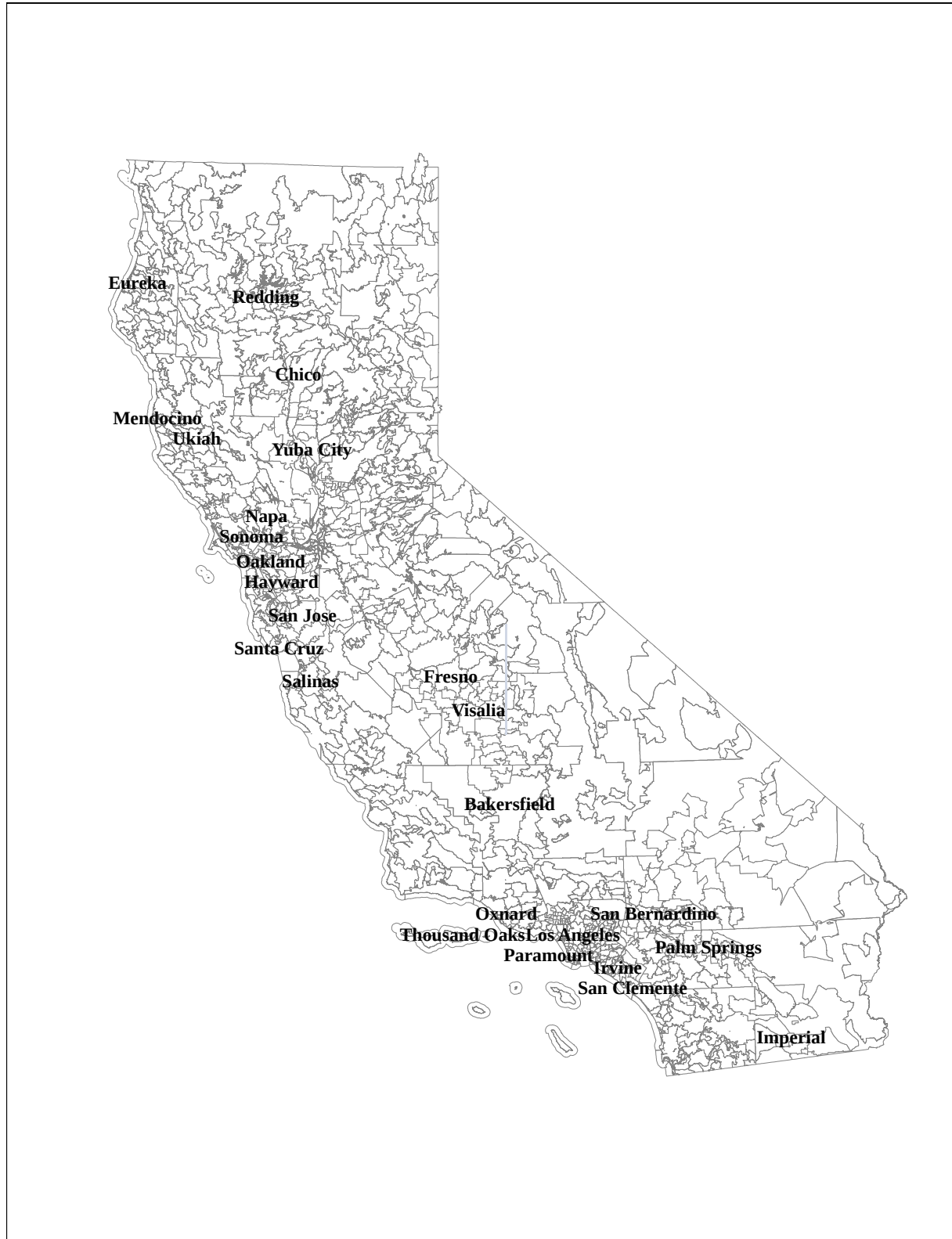


Image 8: Gang Homicide Data by City for the State of California in 1976

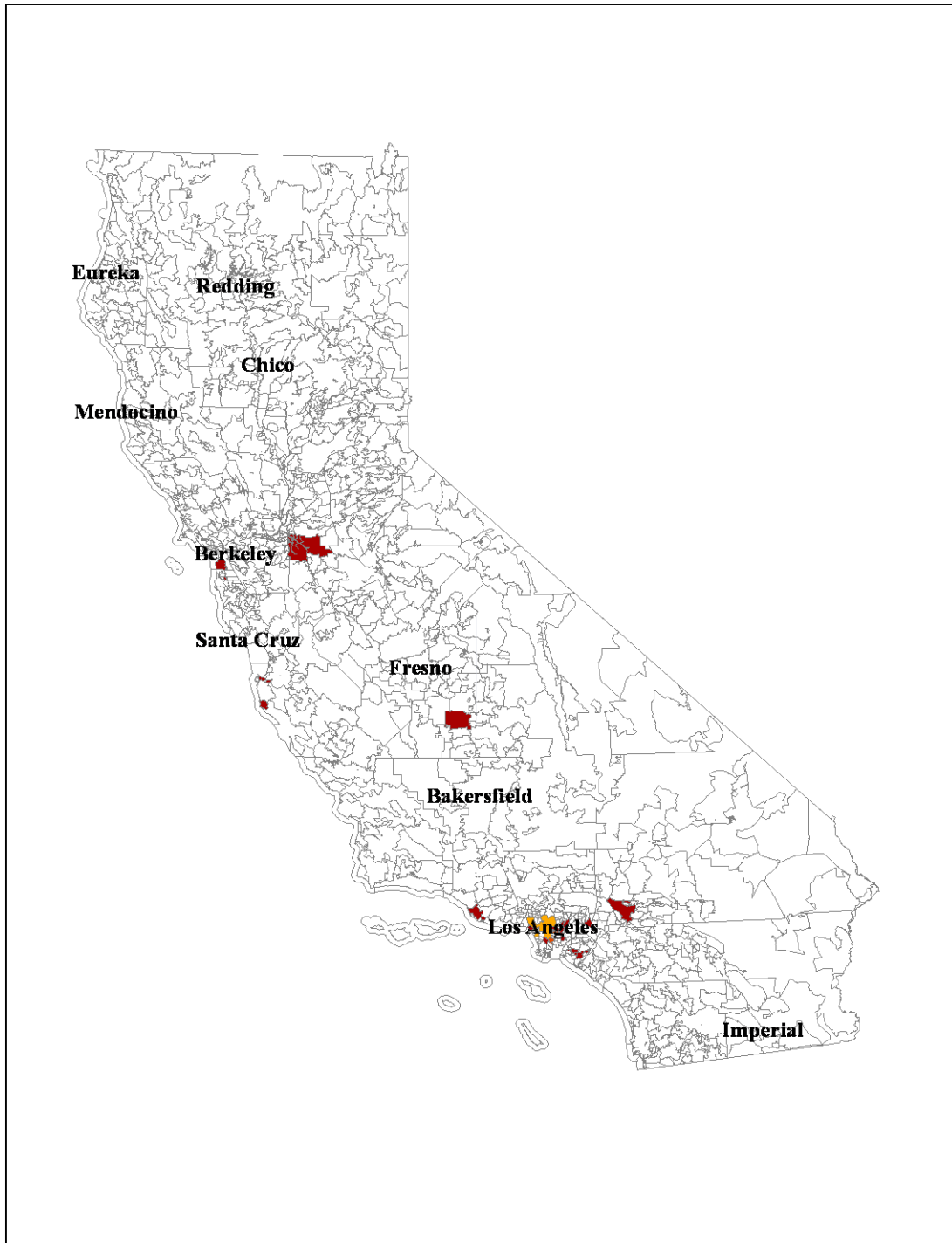


Image 9: Gang Homicide Data by City for the State of California in 1977

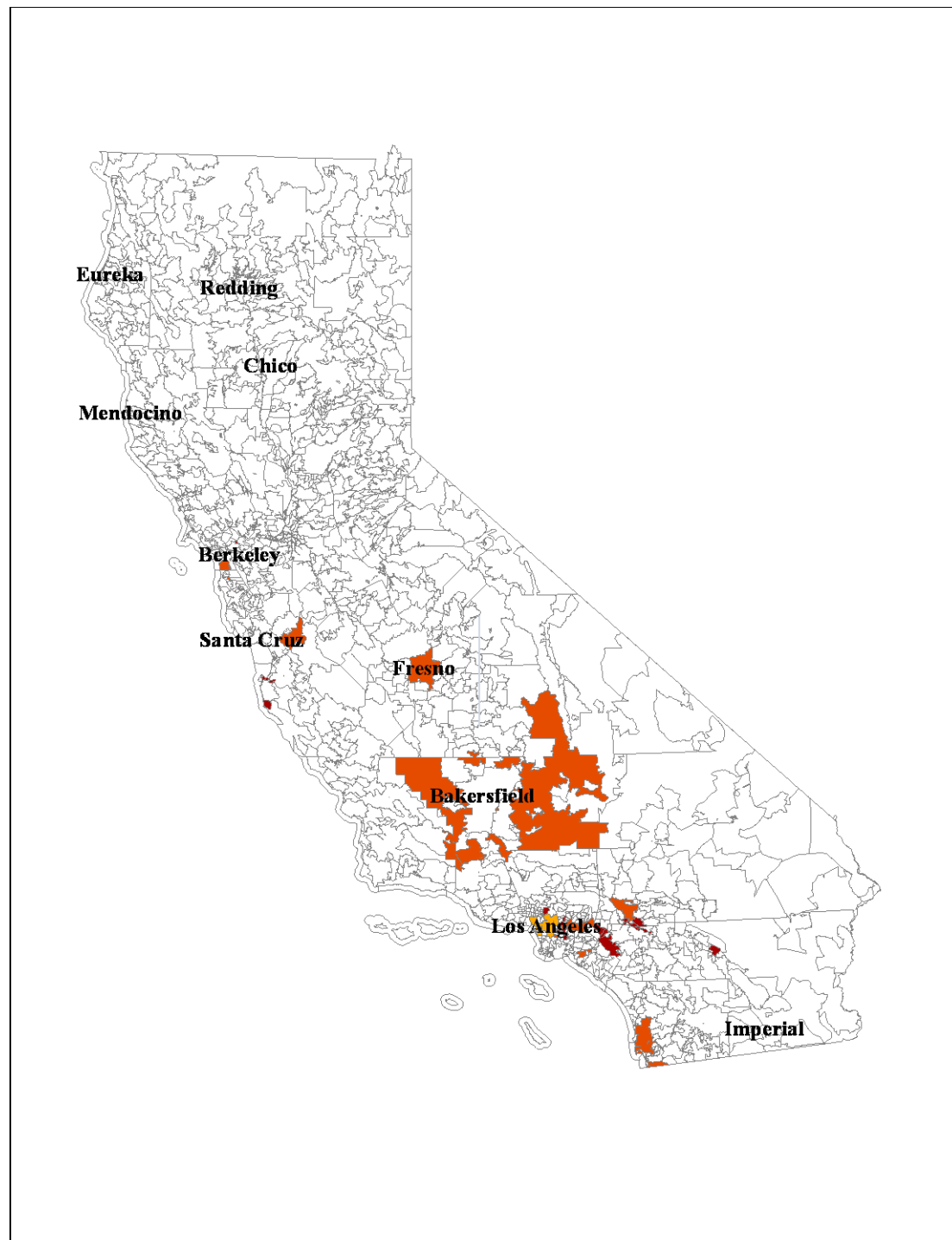


Image 10: Gang Homicide Data by City for the State of California in 1978

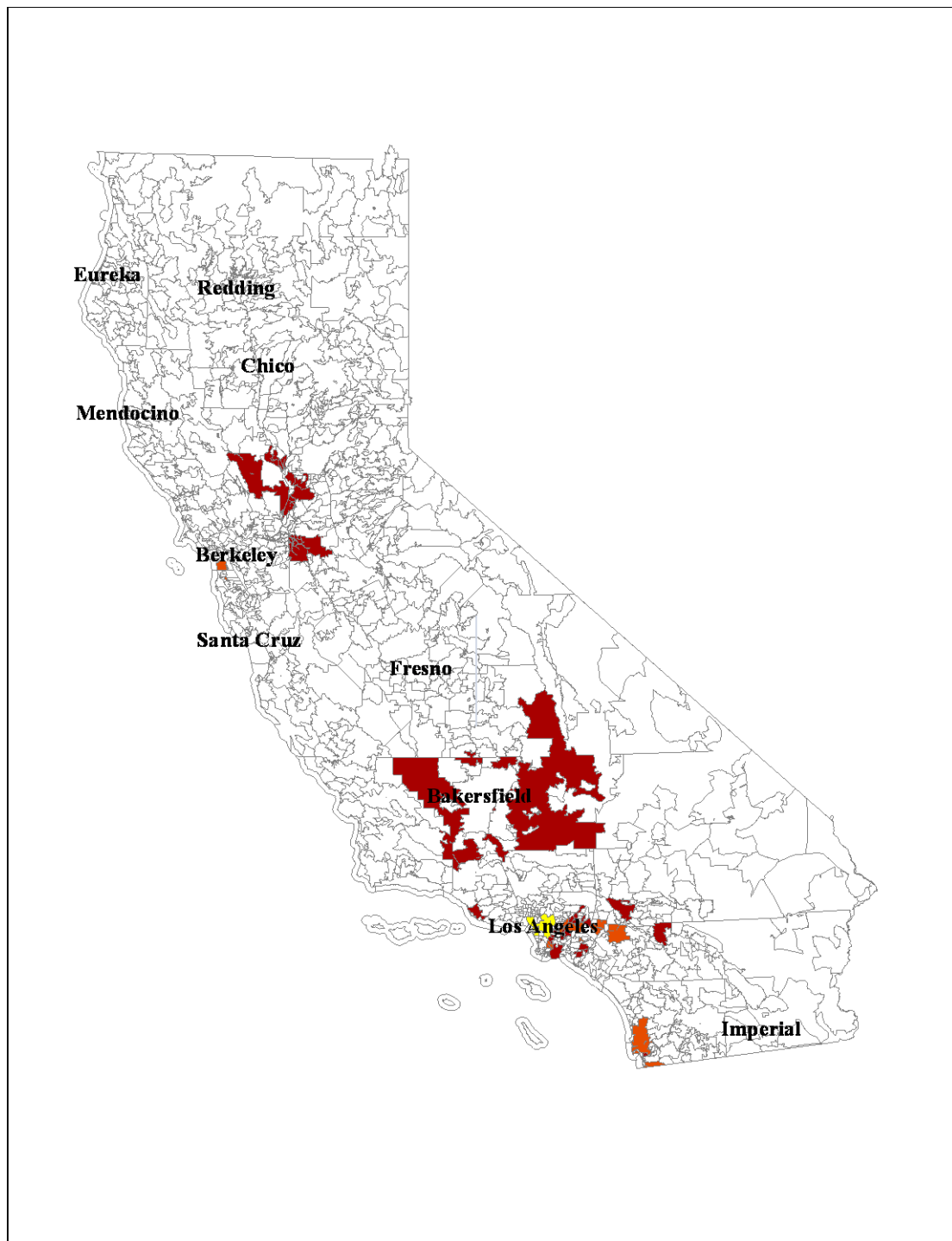


Image 11: Gang Homicide Data by City for the State of California in 1979

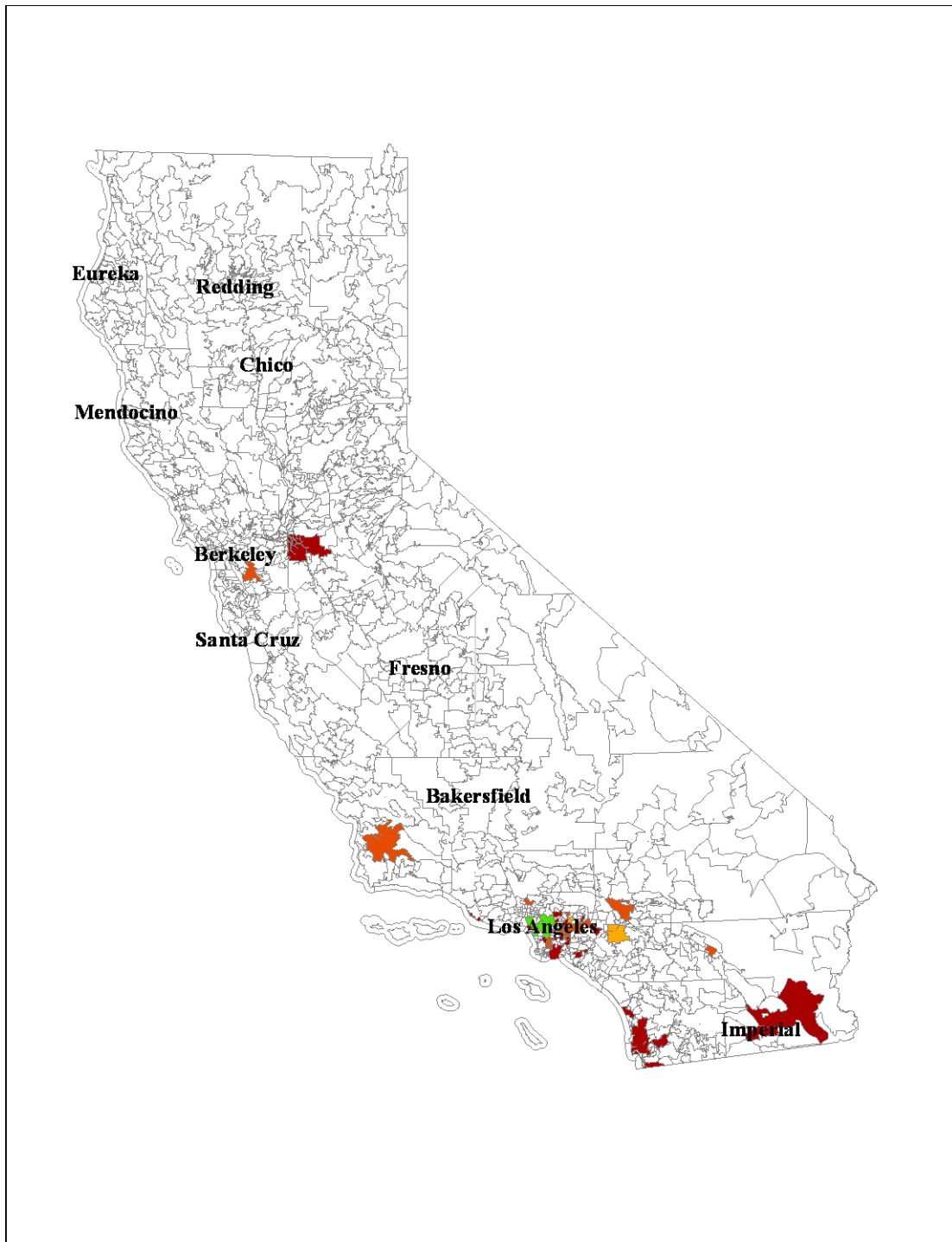


Image 12: Gang Homicide Data by City for the State of California in 1980

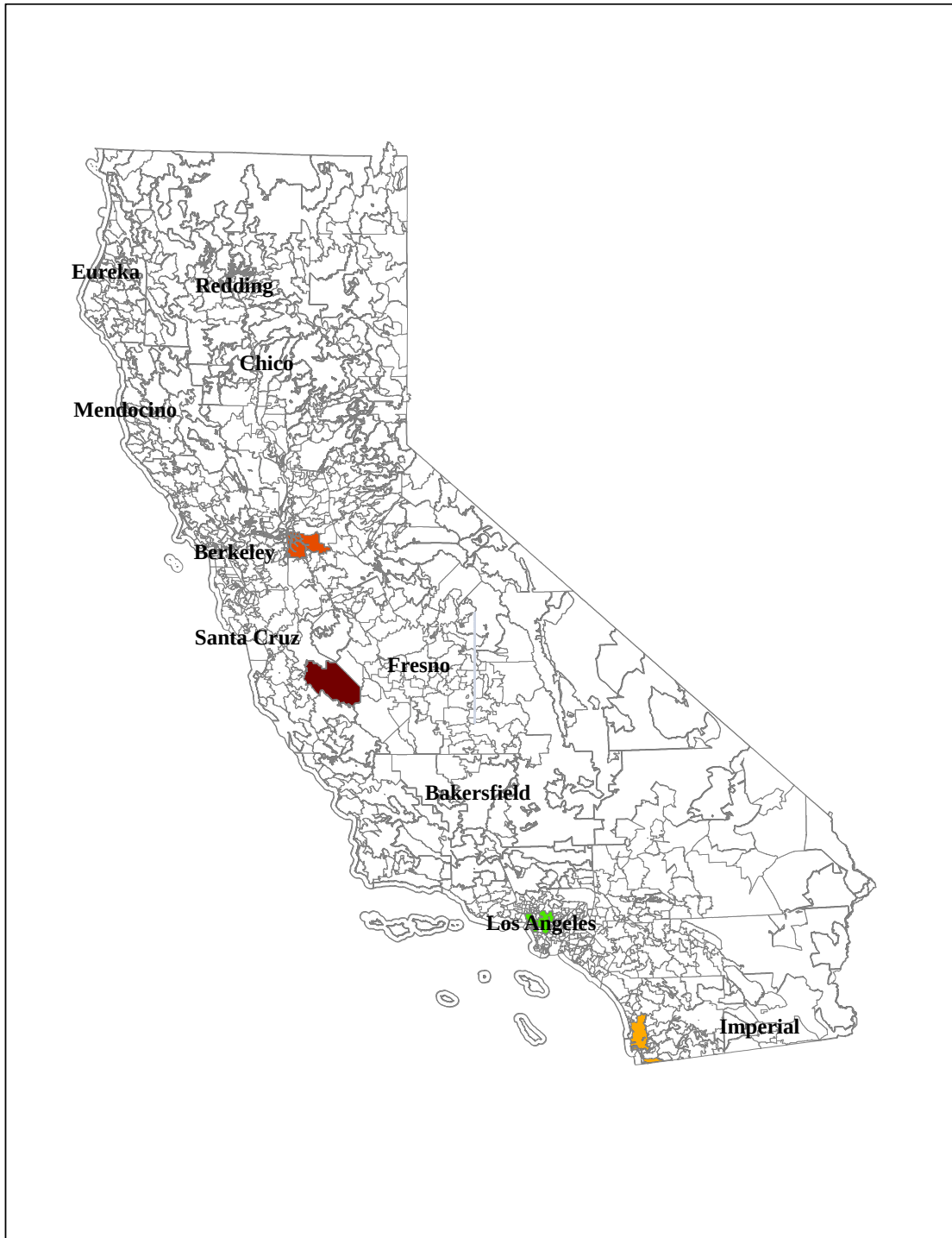


Image 13: Gang Homicide Data by City for the State of California in 1981

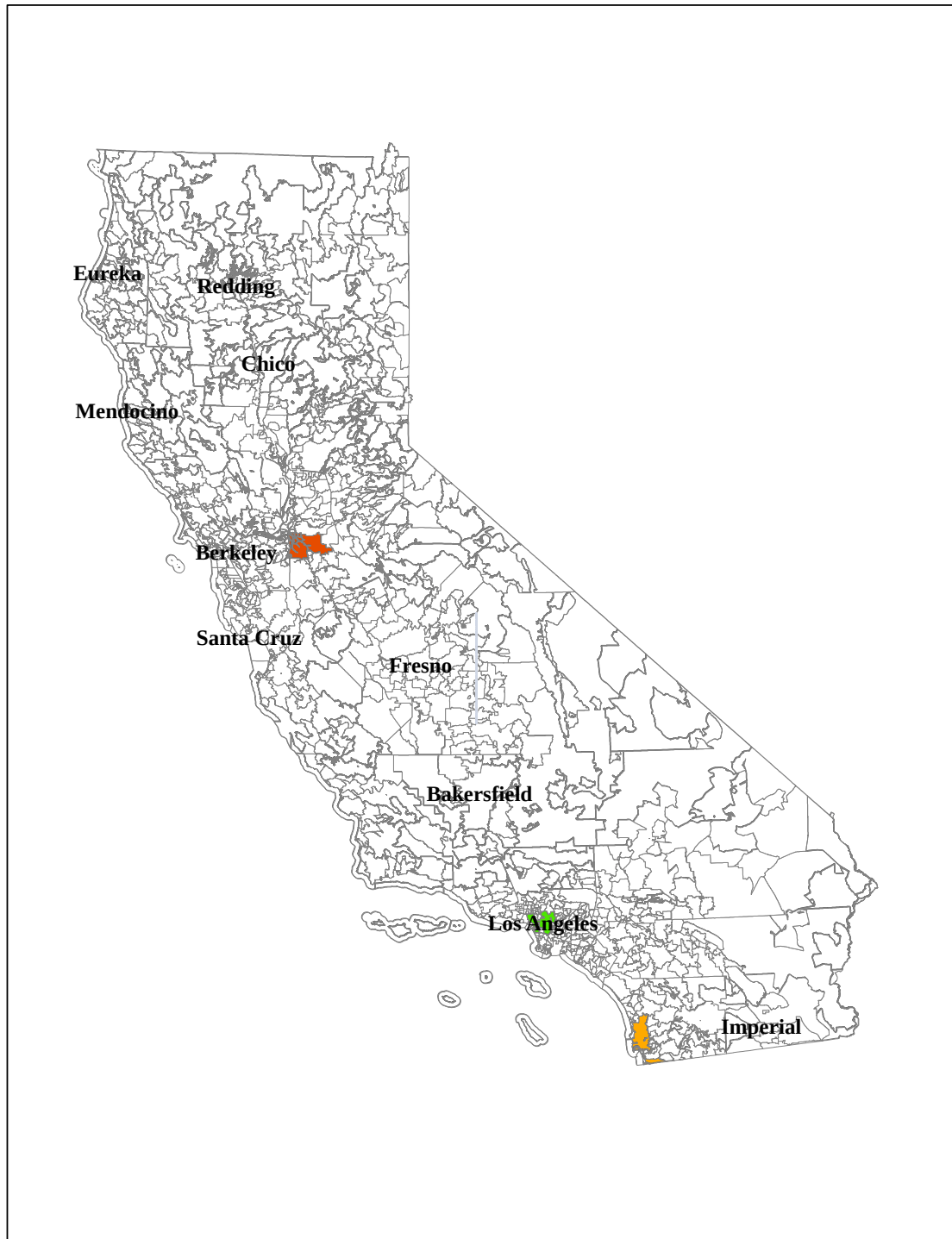


Image 14: Gang Homicide Data by City for the State of California in 1982

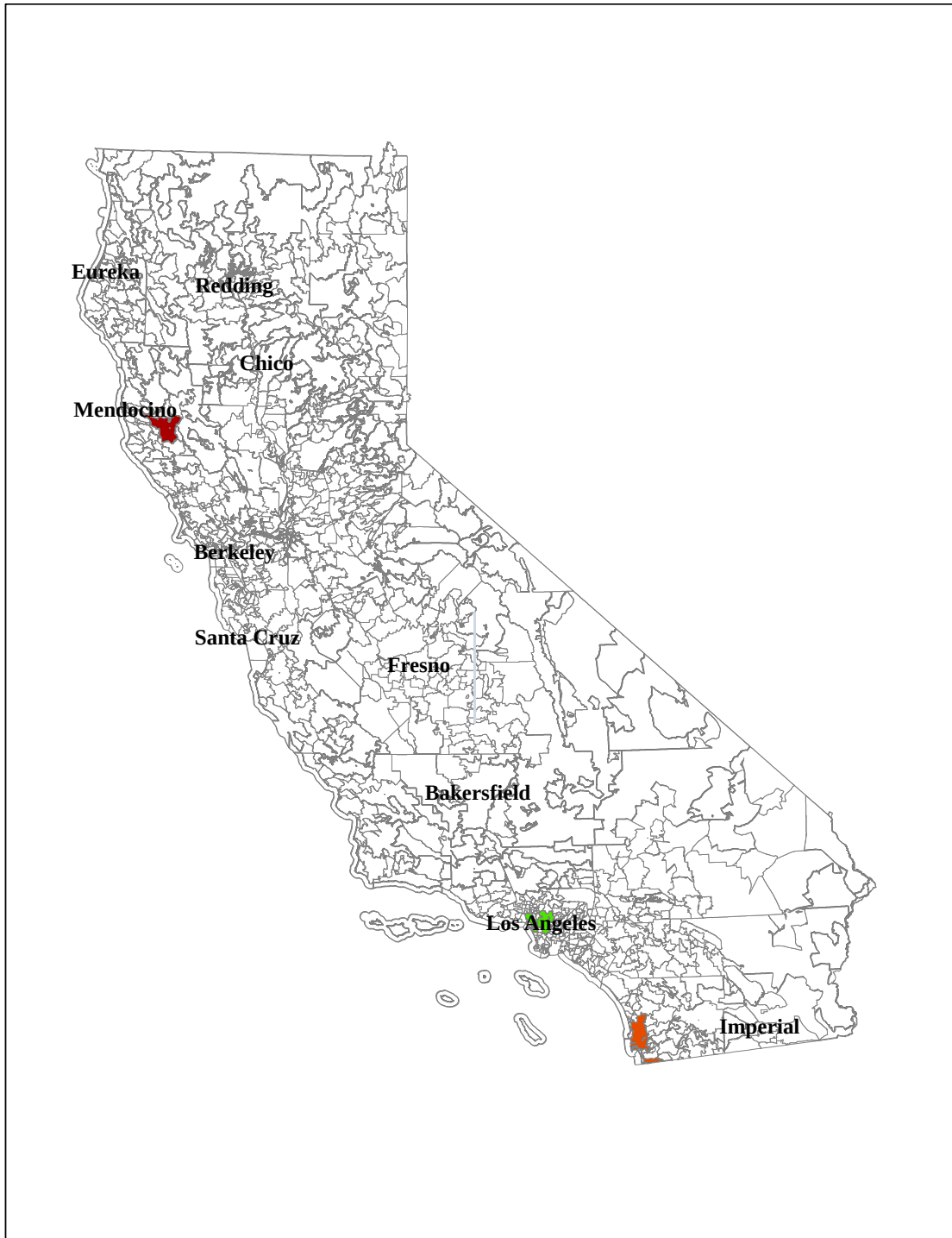


Image 15: Gang Homicide Data by City for the State of California in 1983

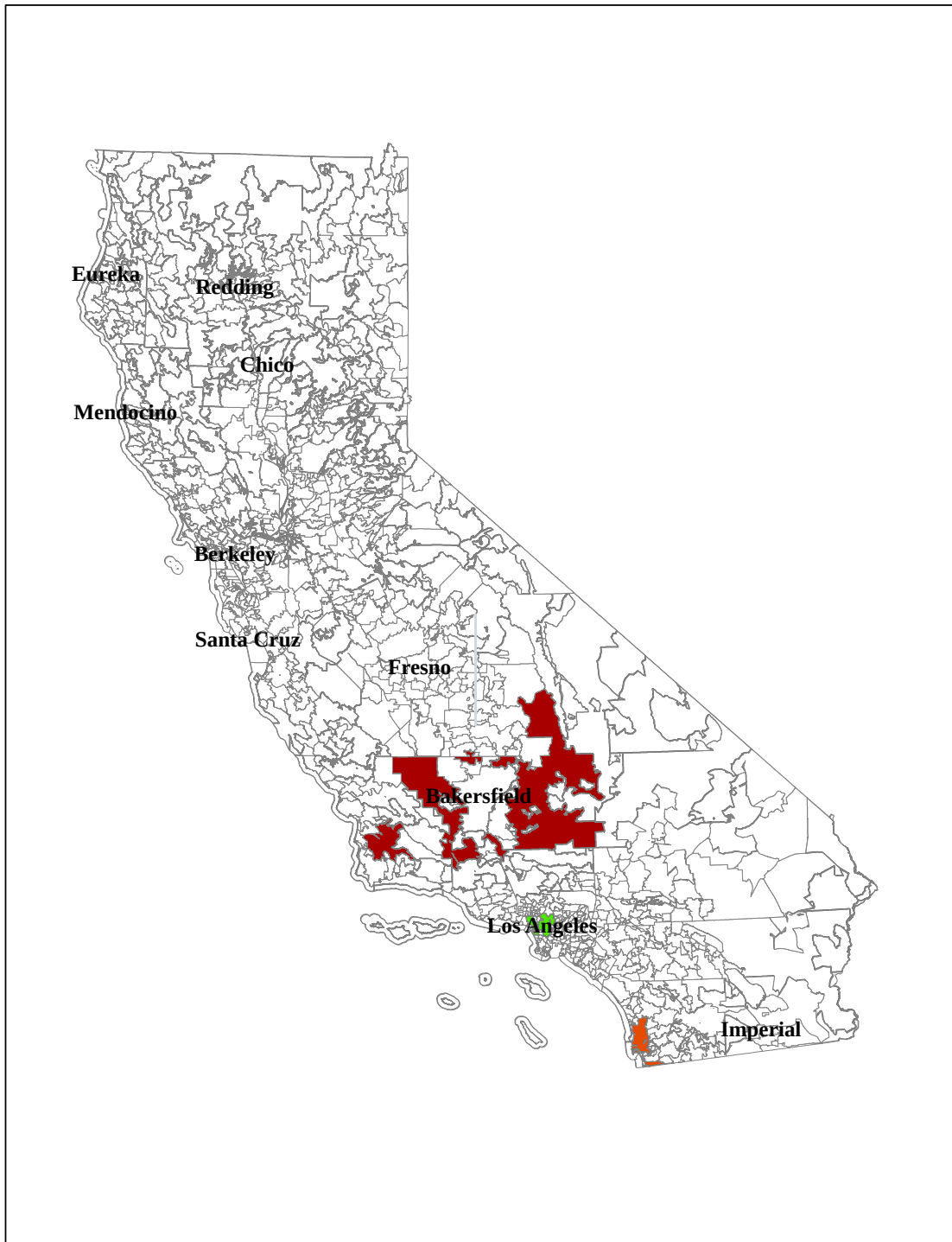


Image 16: Gang Homicide Data by City for the State of California in 1984

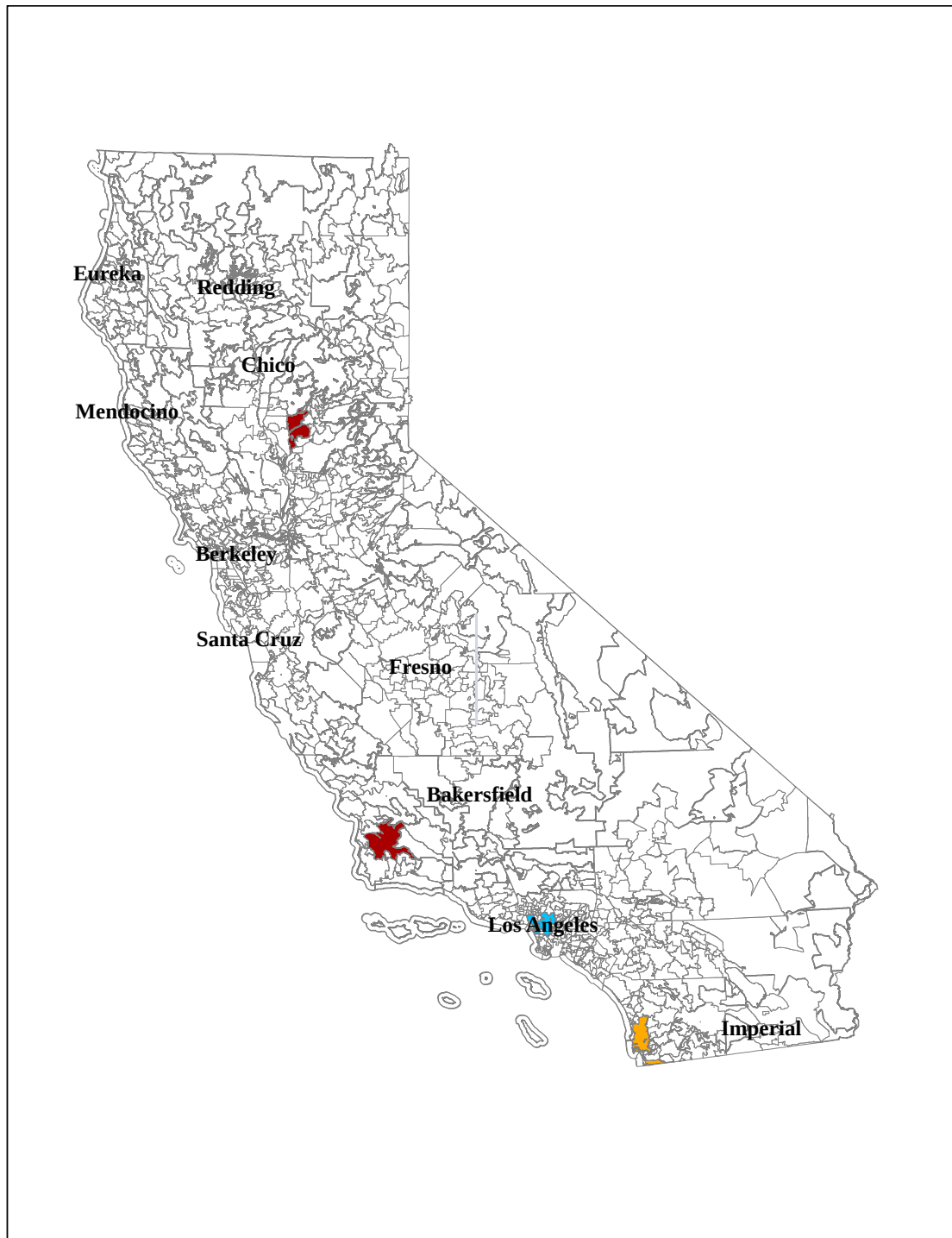


Image 17: Gang Homicide Data by City for the State of California in 1985

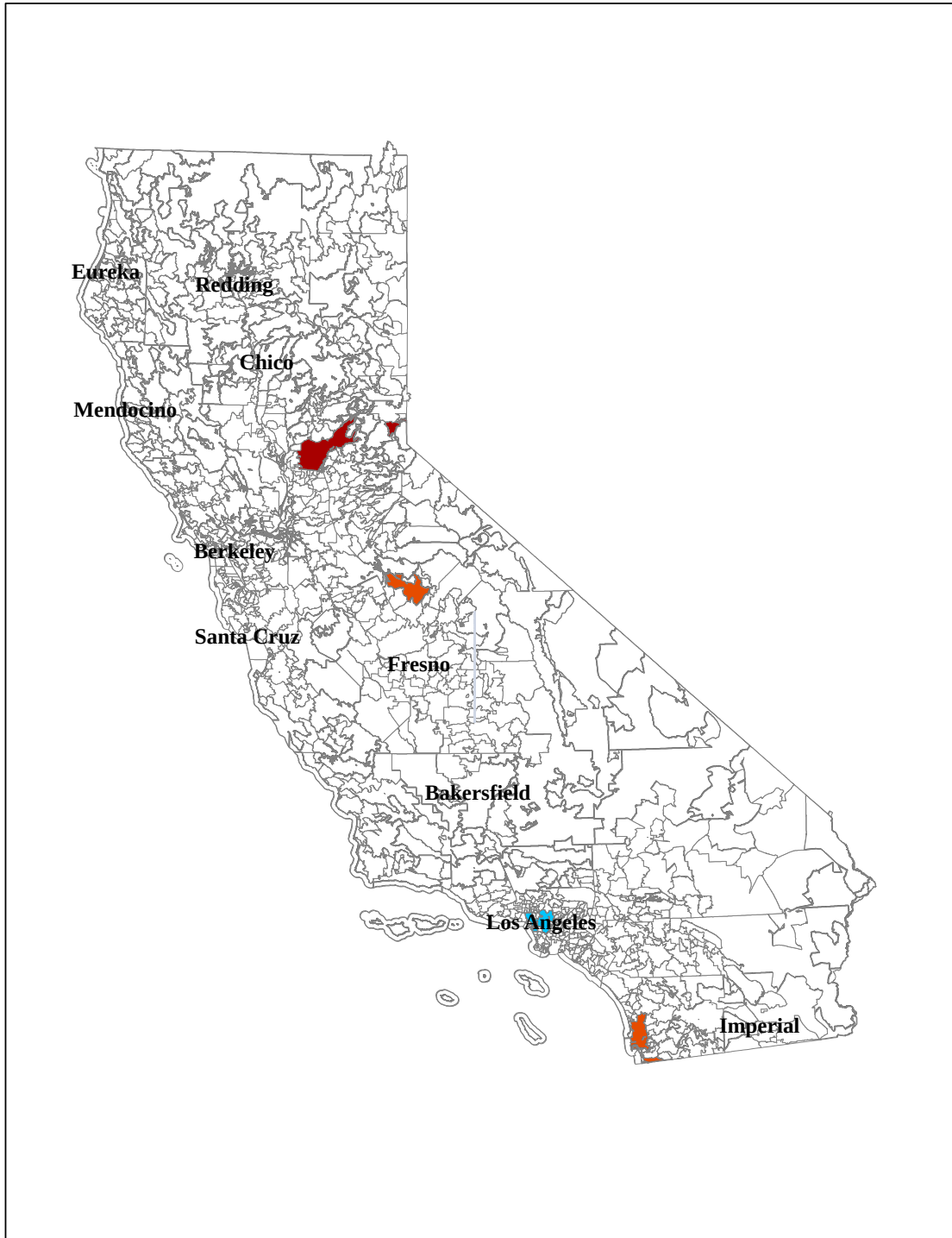


Image 18: Gang Homicide Data by City for the State of California in 1986

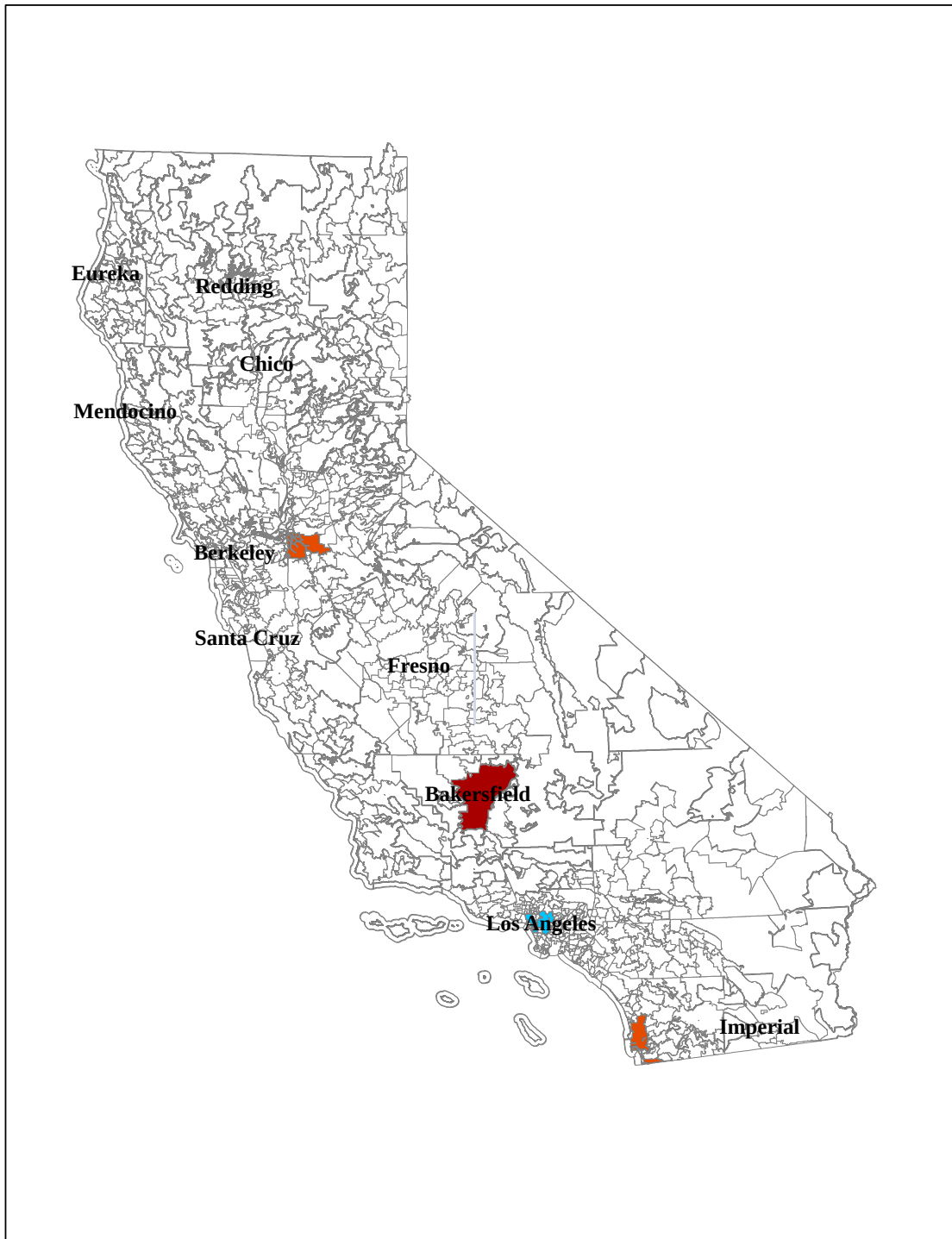


Image 19: Gang Homicide Data by City for the State of California in 1987

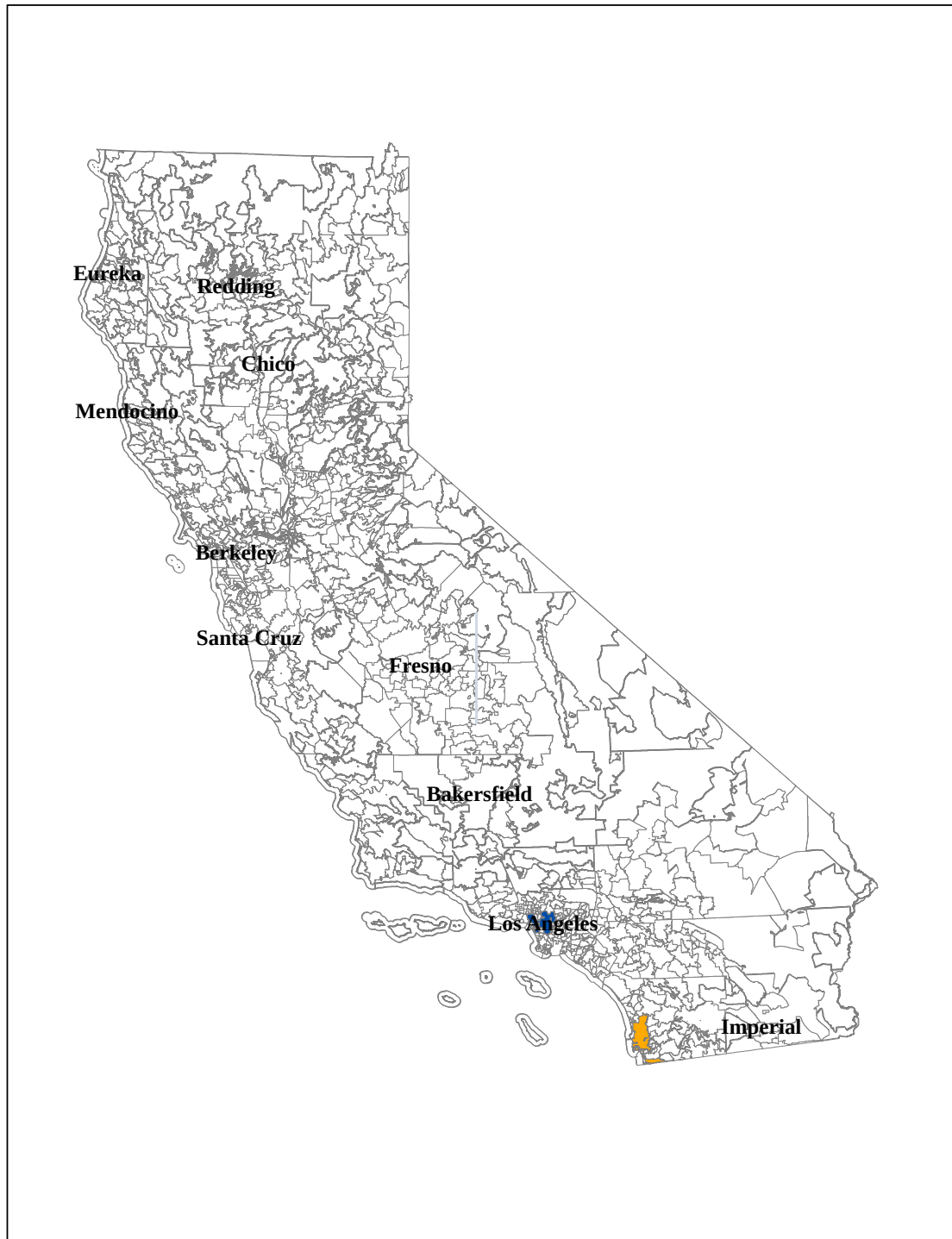


Image 20: Gang Homicide Data by City for the State of California in 1988

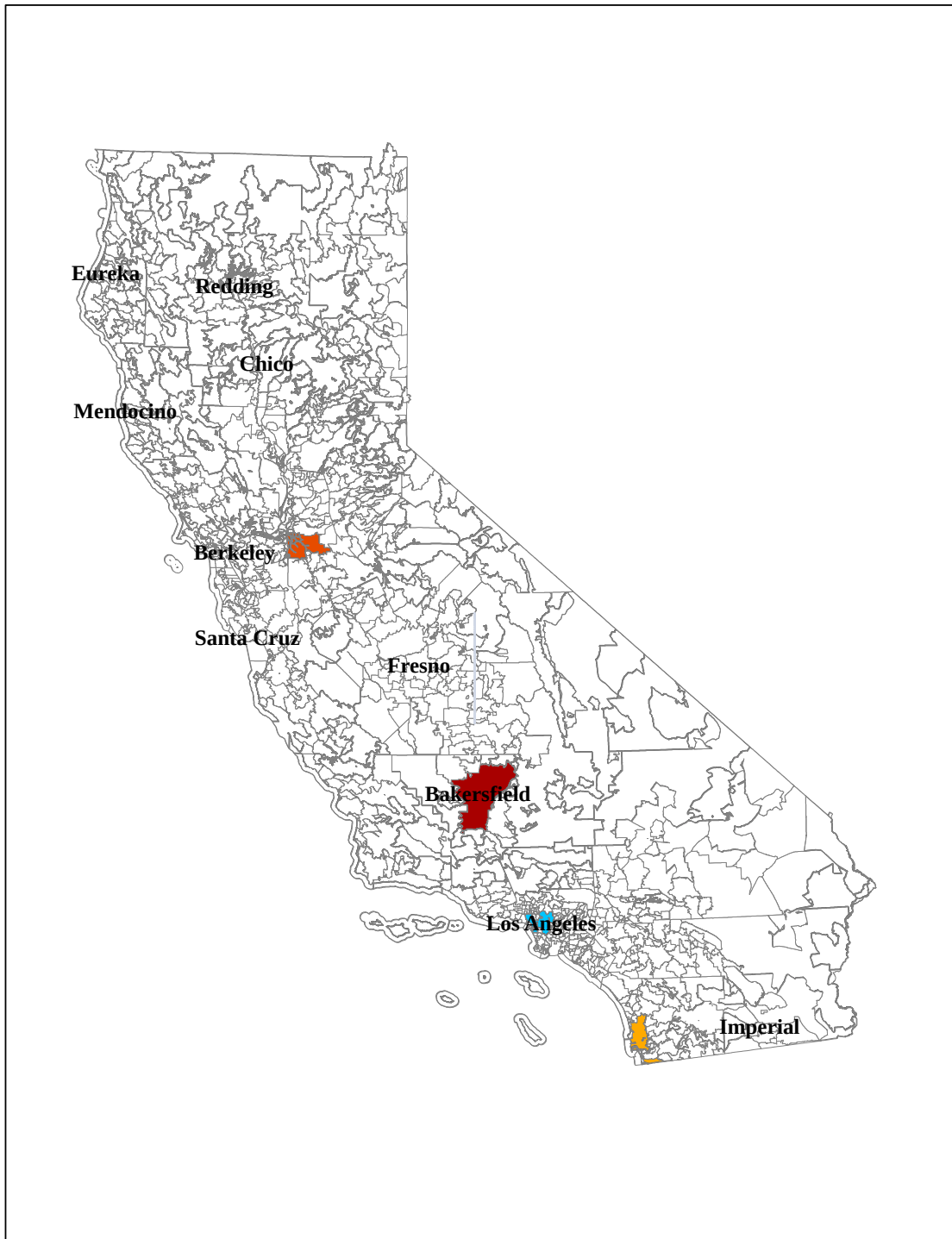


Image 21: Gang Homicide Data by City for the State of California in 1989

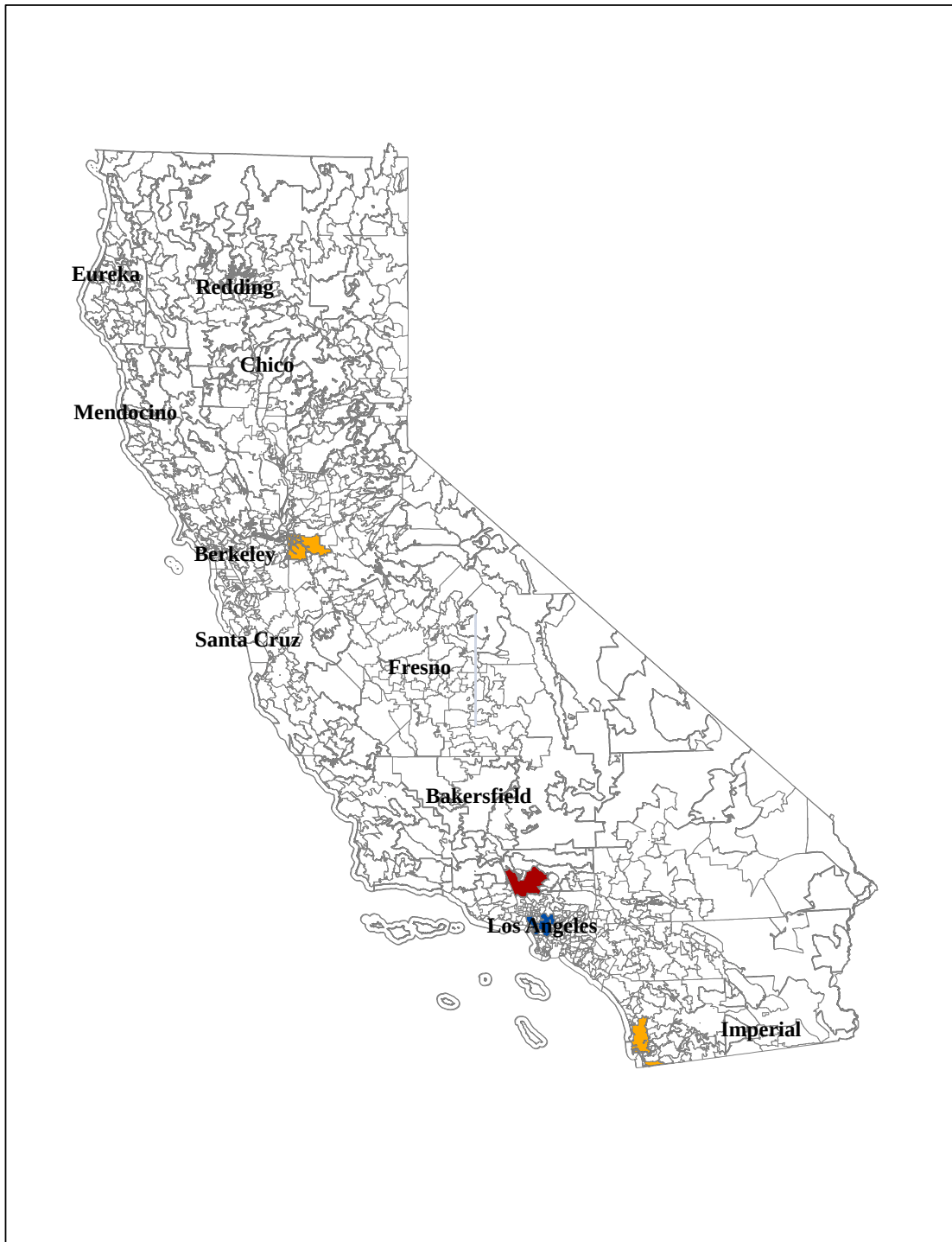


Image 22: Gang Homicide Data by City for the State of California in 1990

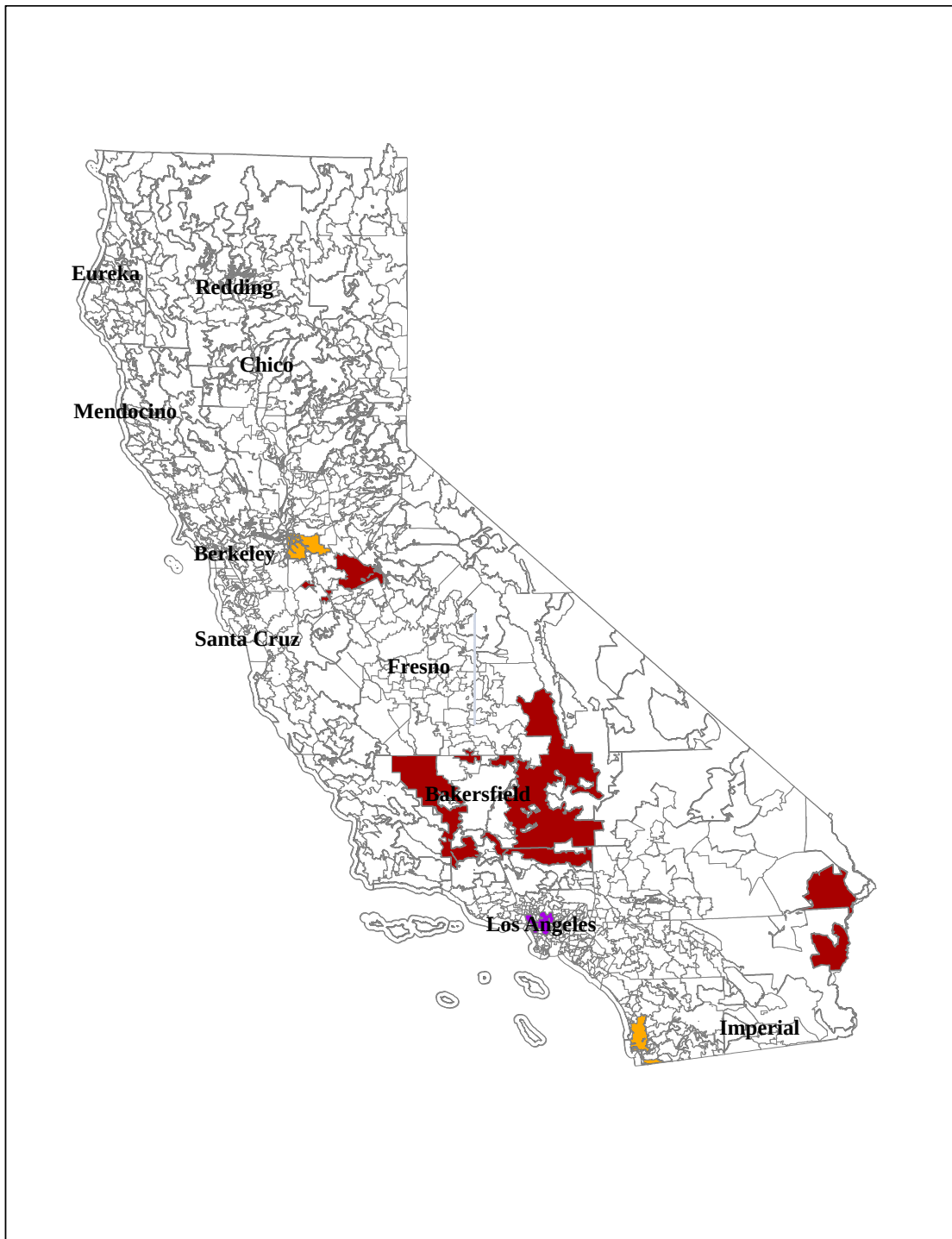


Image 23: Gang Homicide Data by City for the State of California in 1991

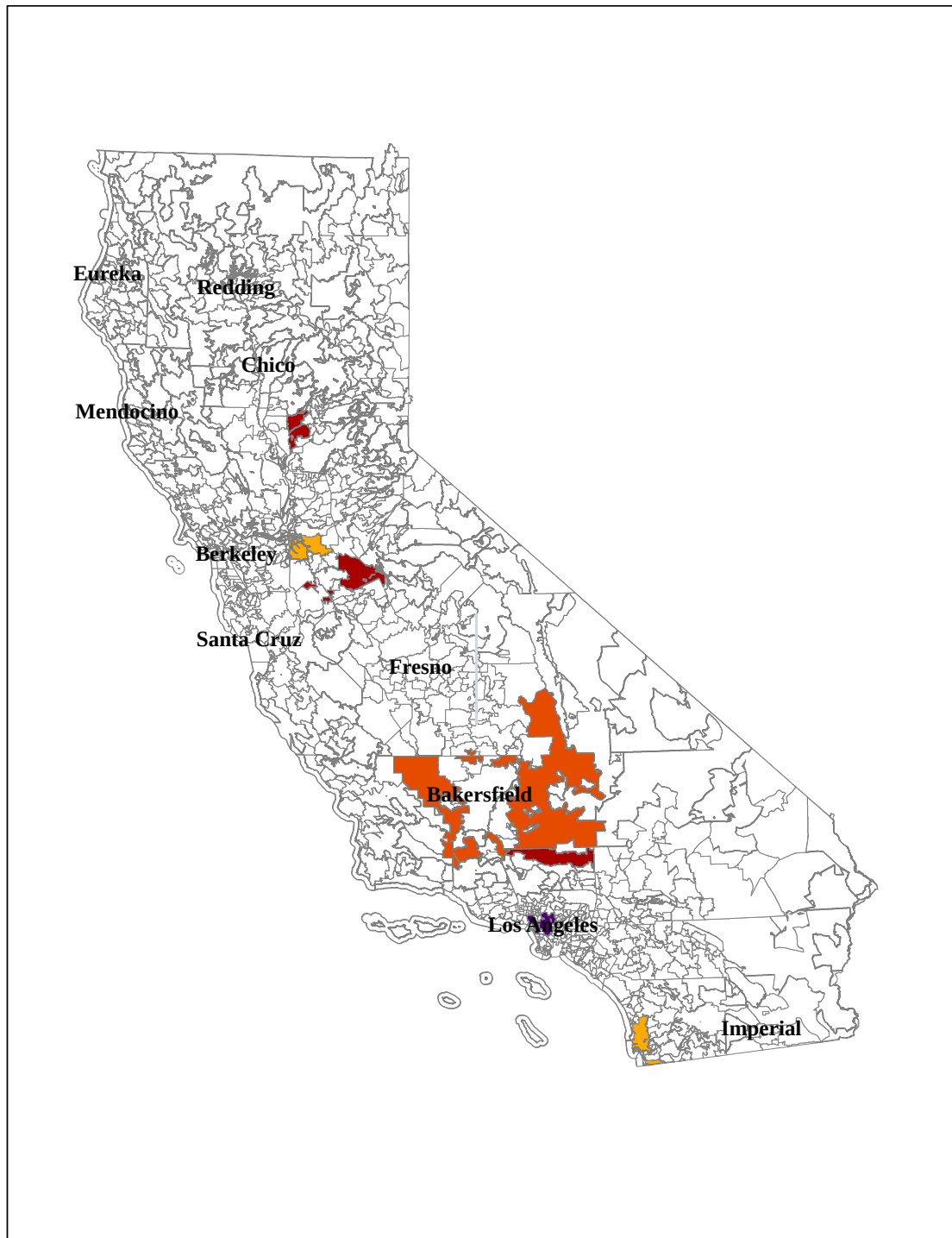


Image 24: Gang Homicide Data by City for the State of California in 1992

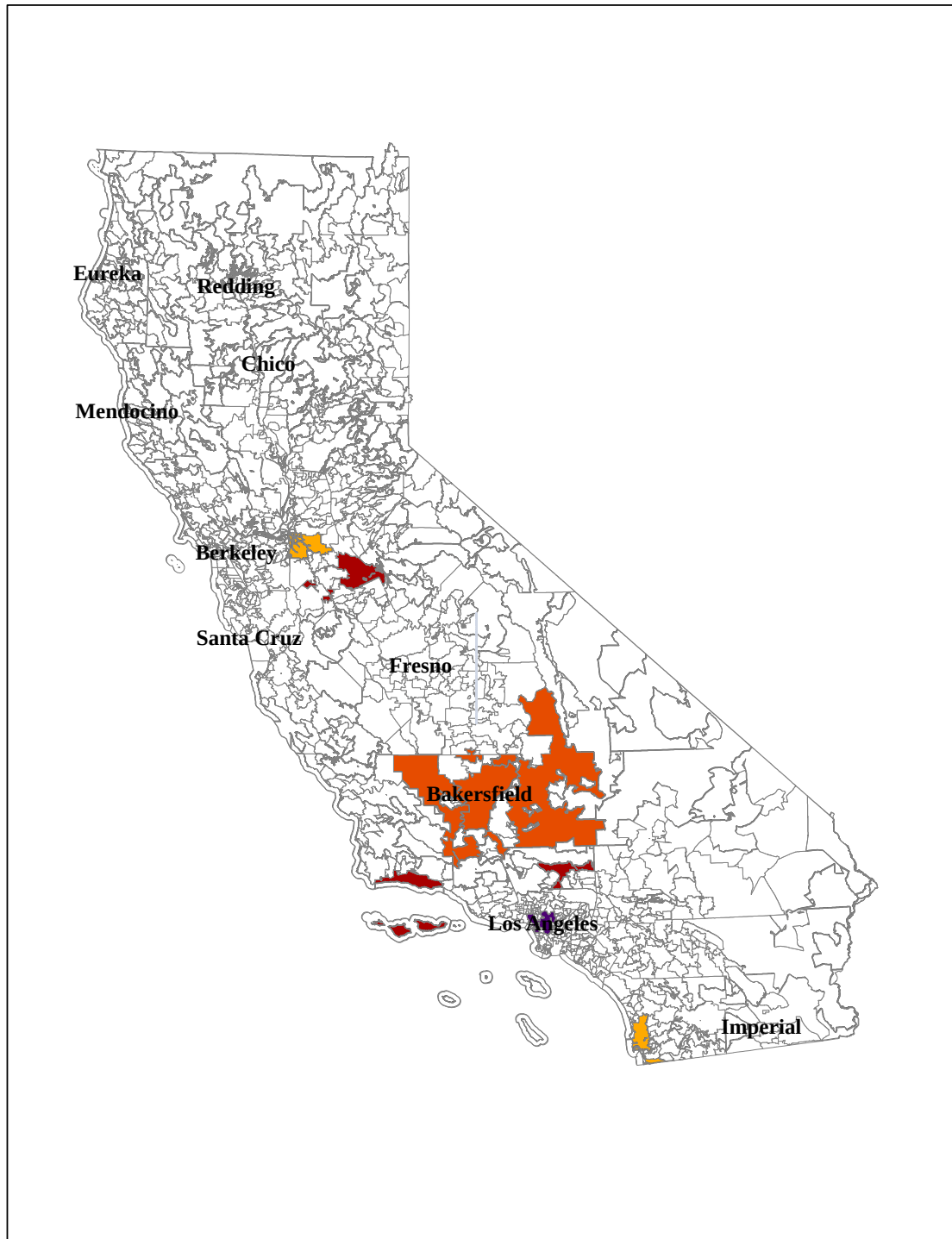


Image 25: Gang Homicide Data by City for the State of California in 1993

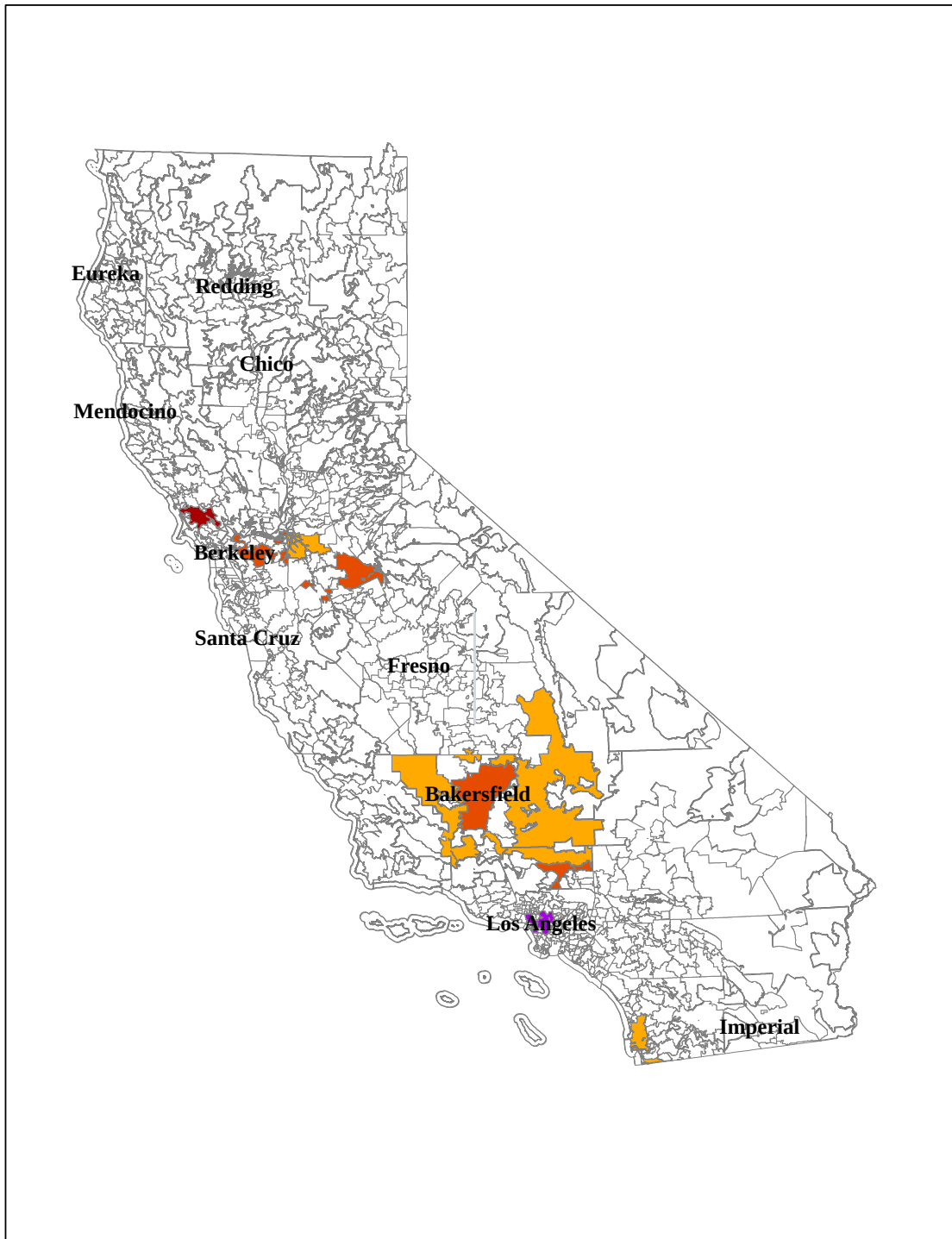


Image 26: Gang Homicide Data by City for the State of California in 1994

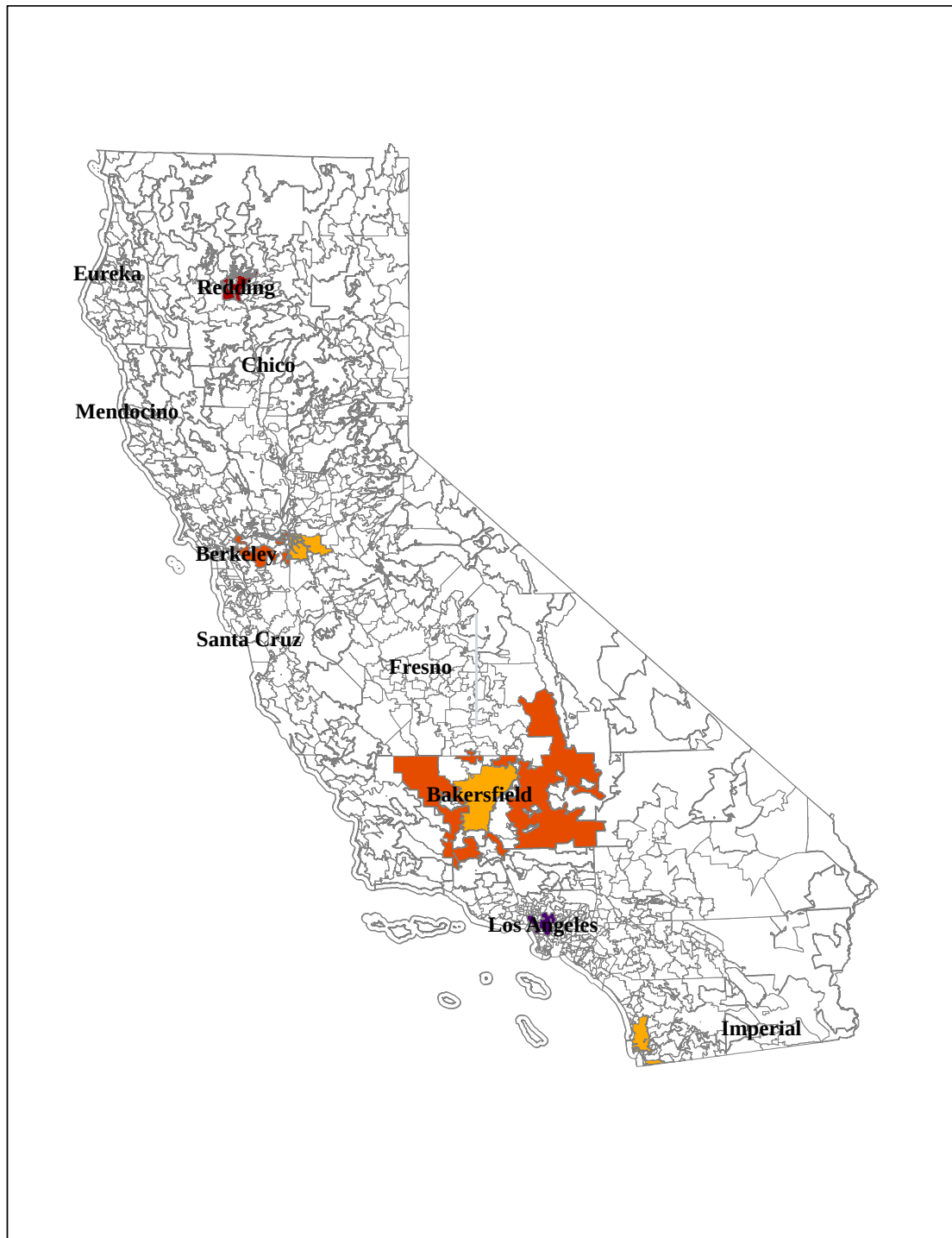


Image 27: Gang Homicide Data by City for the State of California in 1995

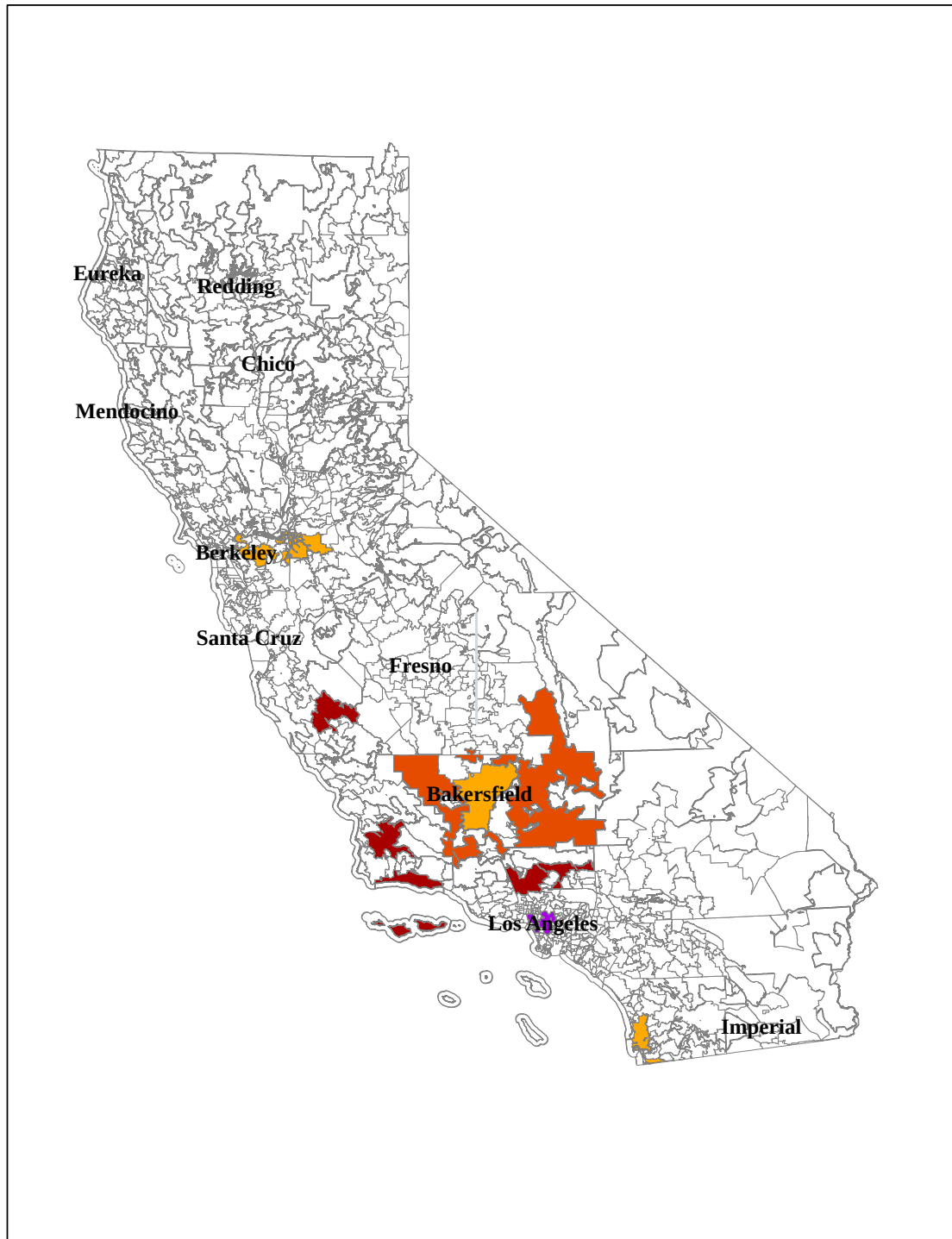


Image 28: Gang Homicide Data by City for the State of California in 1996

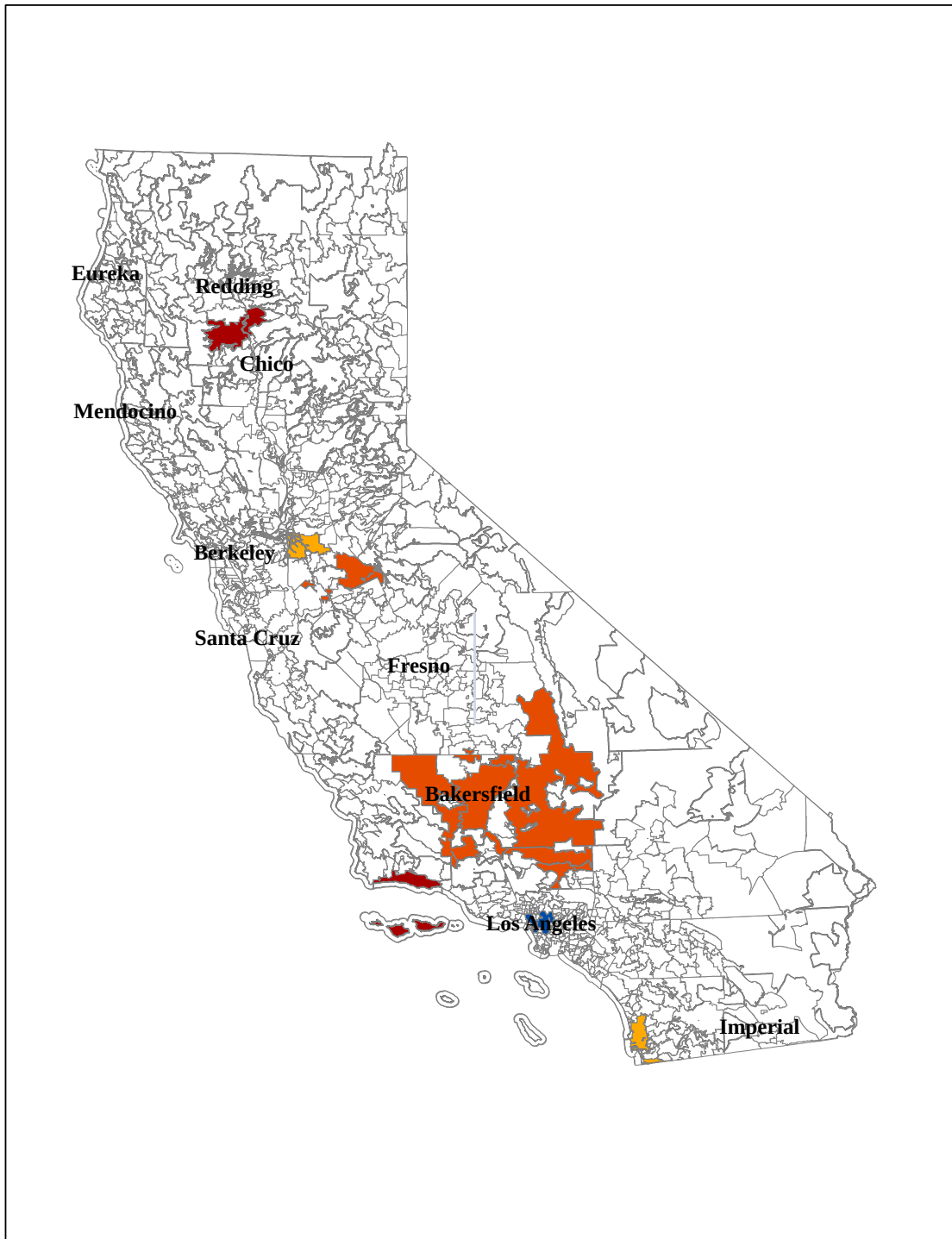


Image 29: Gang Homicide Data by City for the State of California in 1997

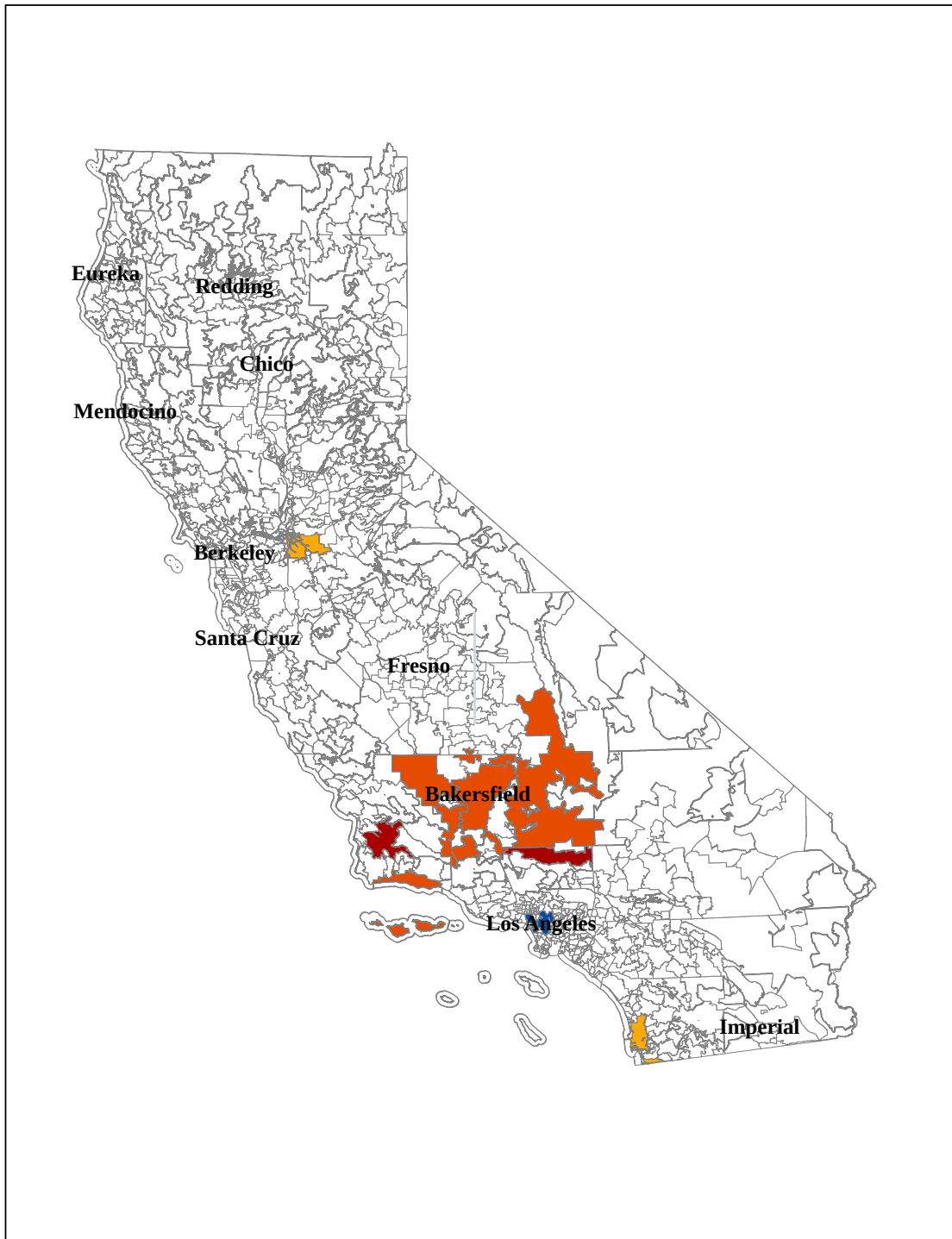


Image 30: Gang Homicide Data by City for the State of California in 1998

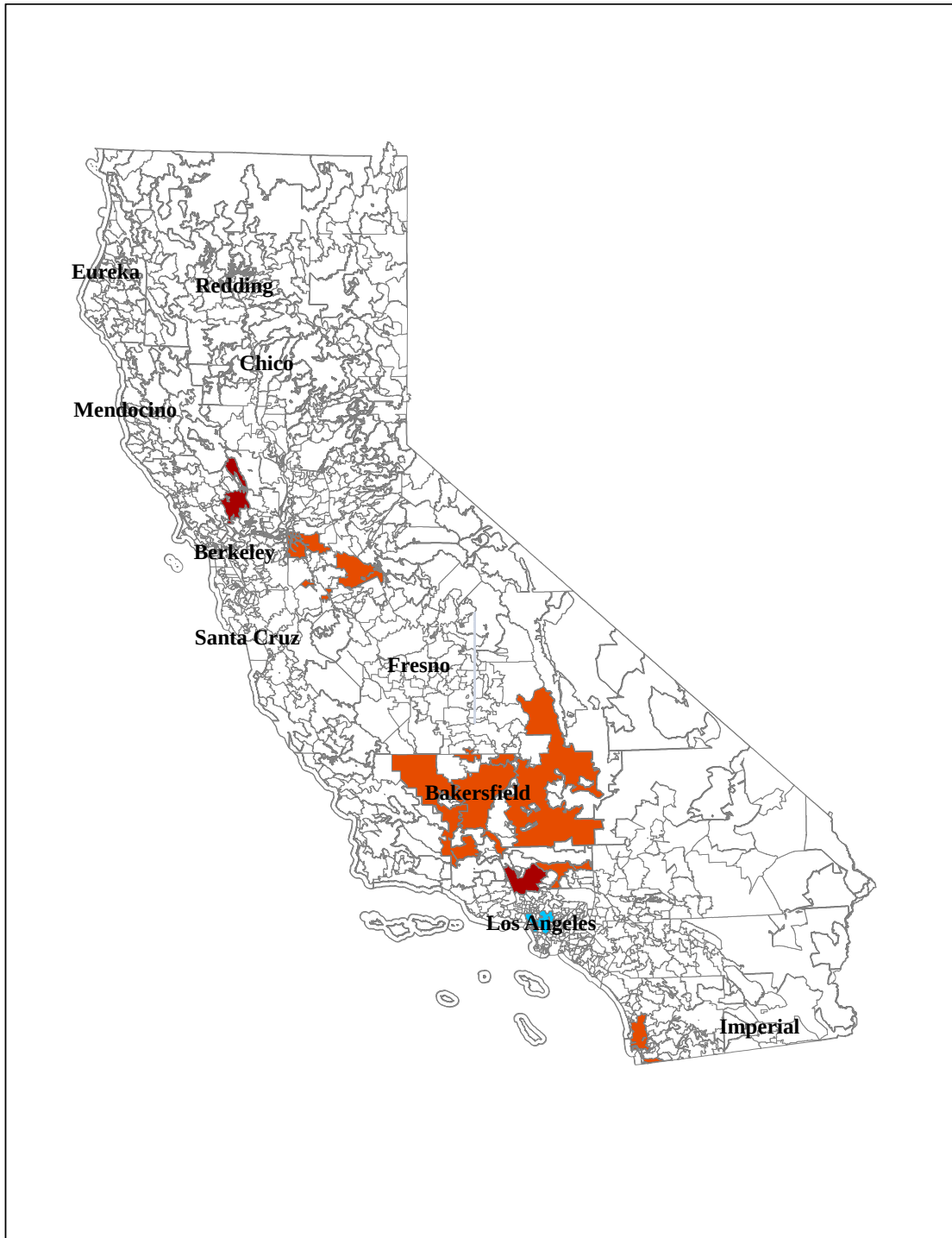


Image 31: Gang Homicide Data by City for the State of California in 1999

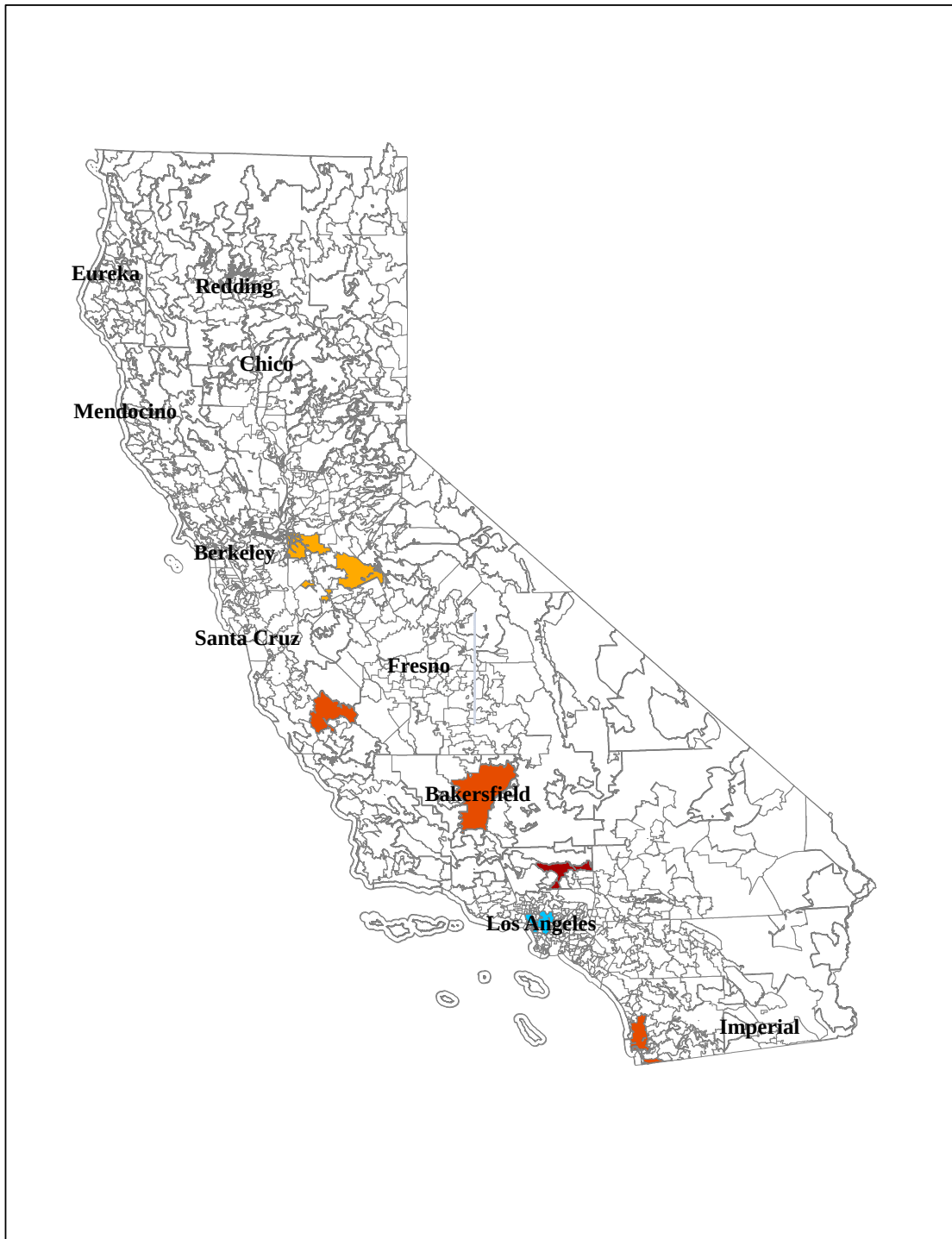


Image 32: Gang Homicide Data by City for the State of California in 2000

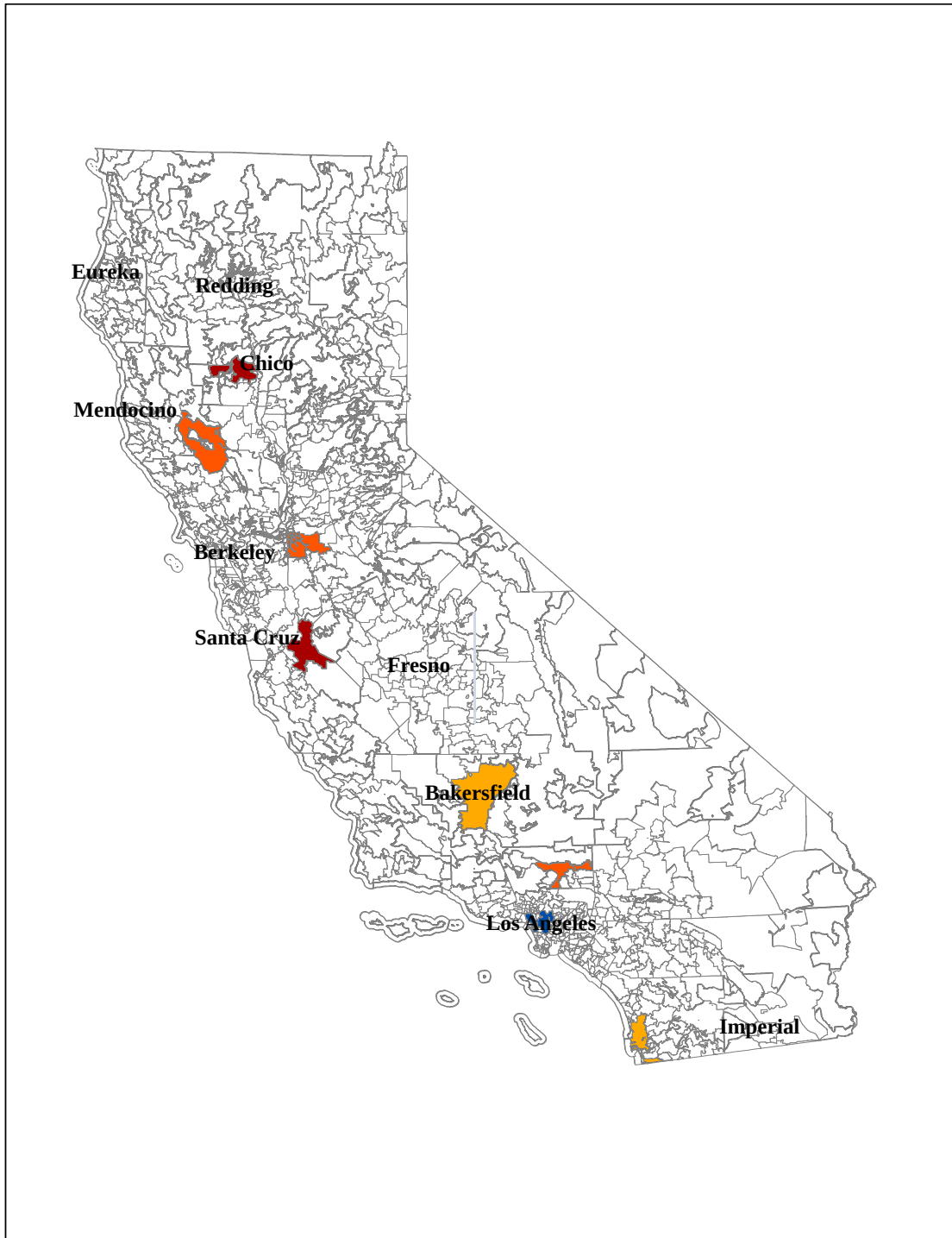


Image 33: Gang Homicide Data by City for the State of California in 2001

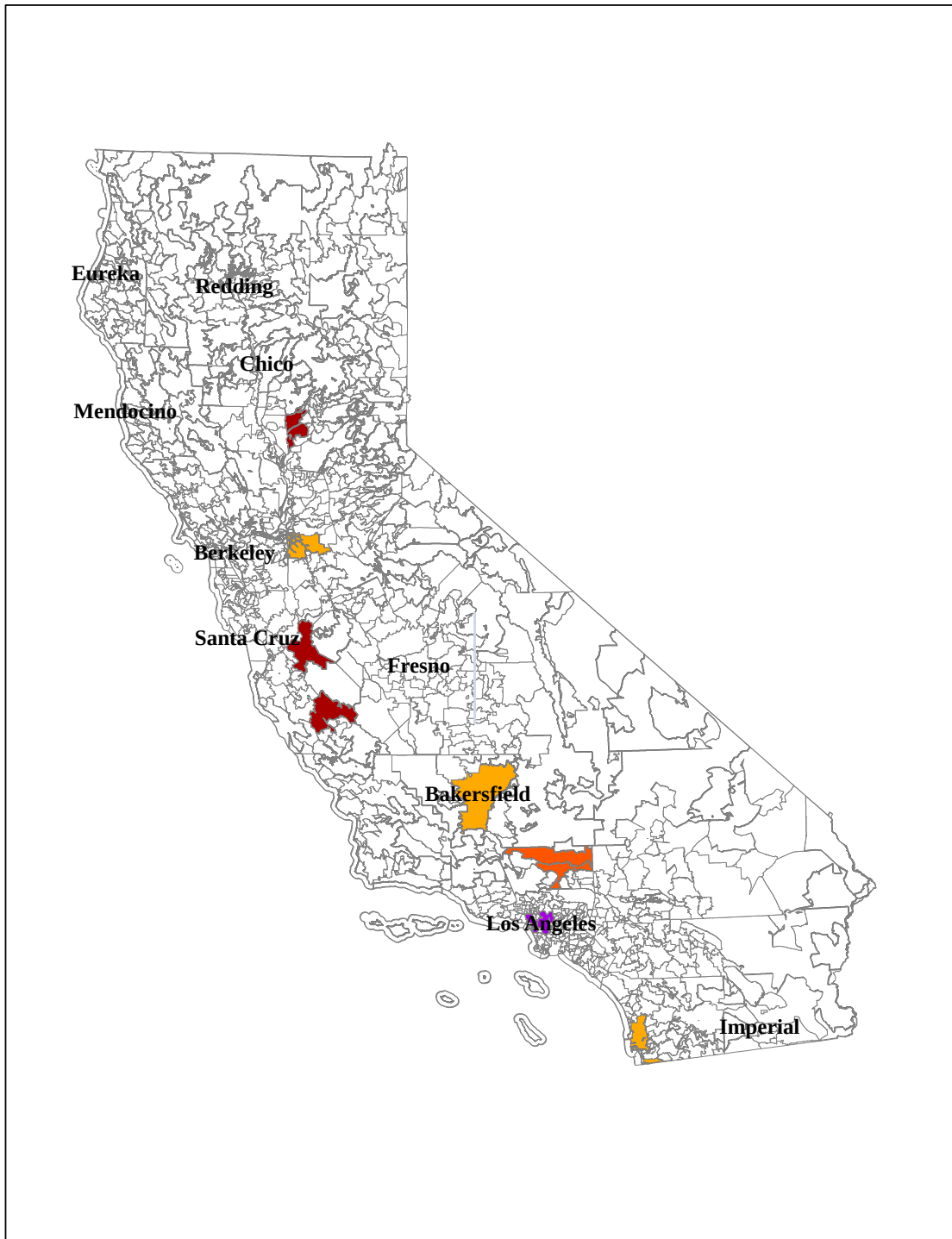


Image 34: Gang Homicide Data by City for the State of California in 2002

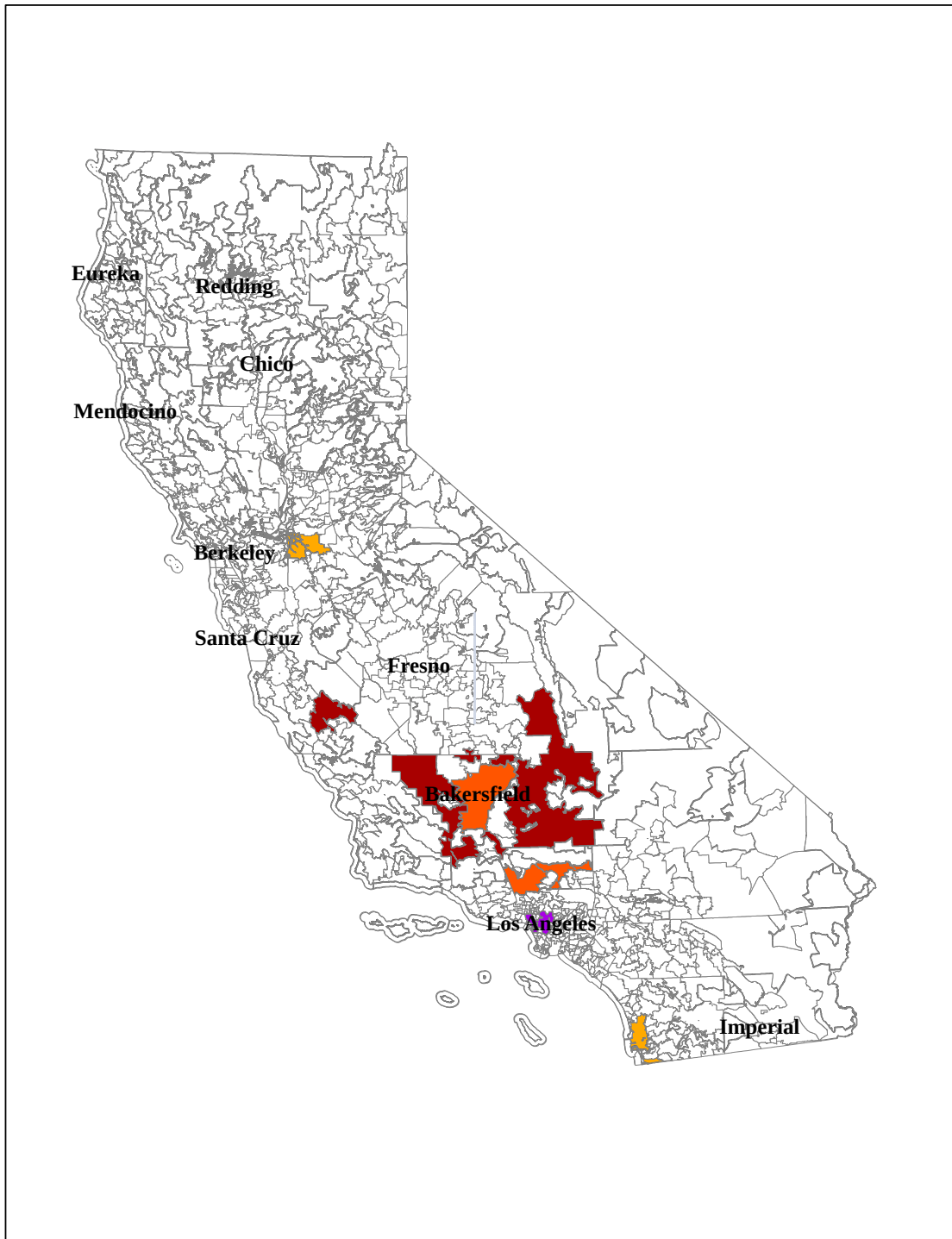


Image 35: Gang Homicide Data by City for the State of California in 2003

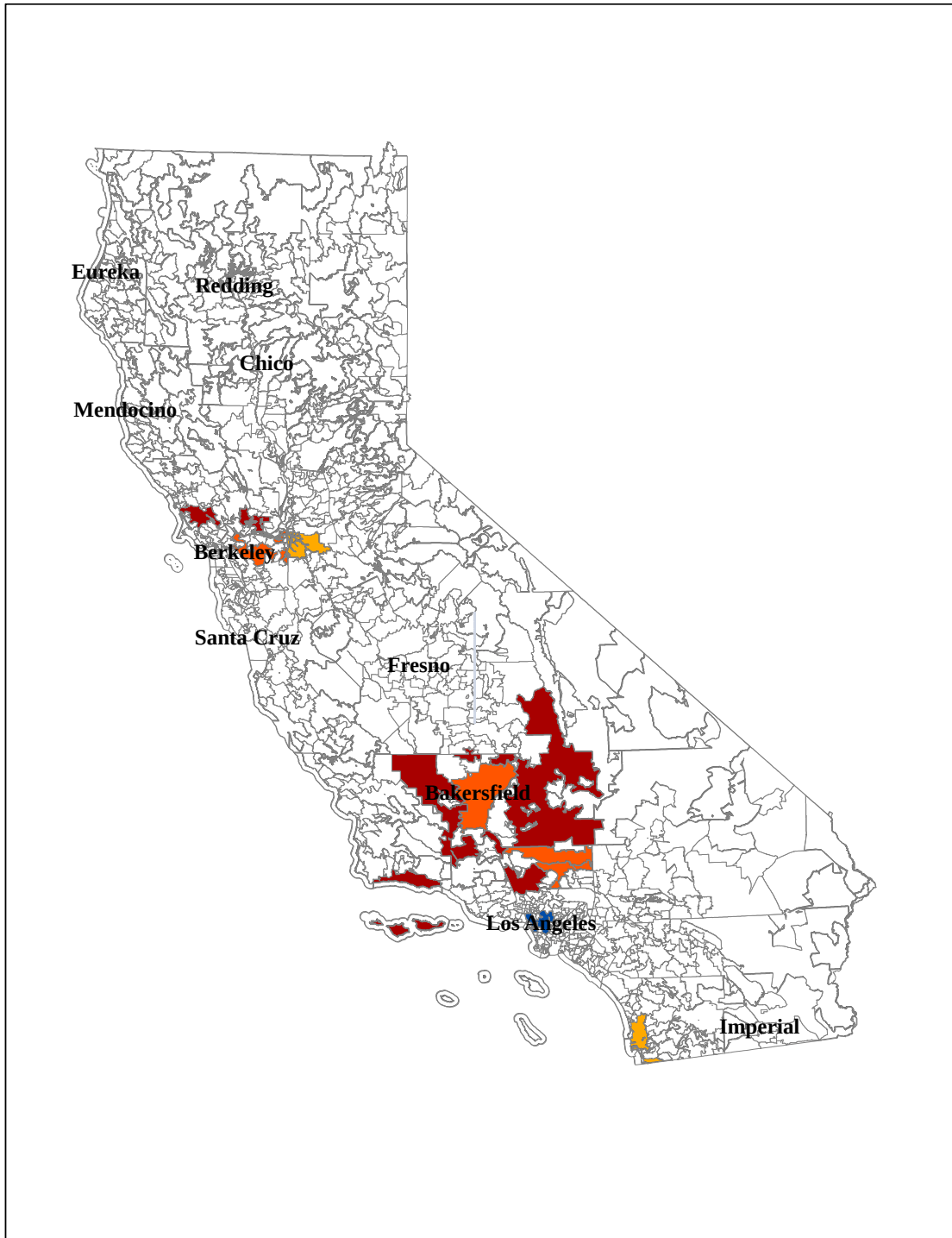


Image 36: Gang Homicide Data by City for the State of California in 2004

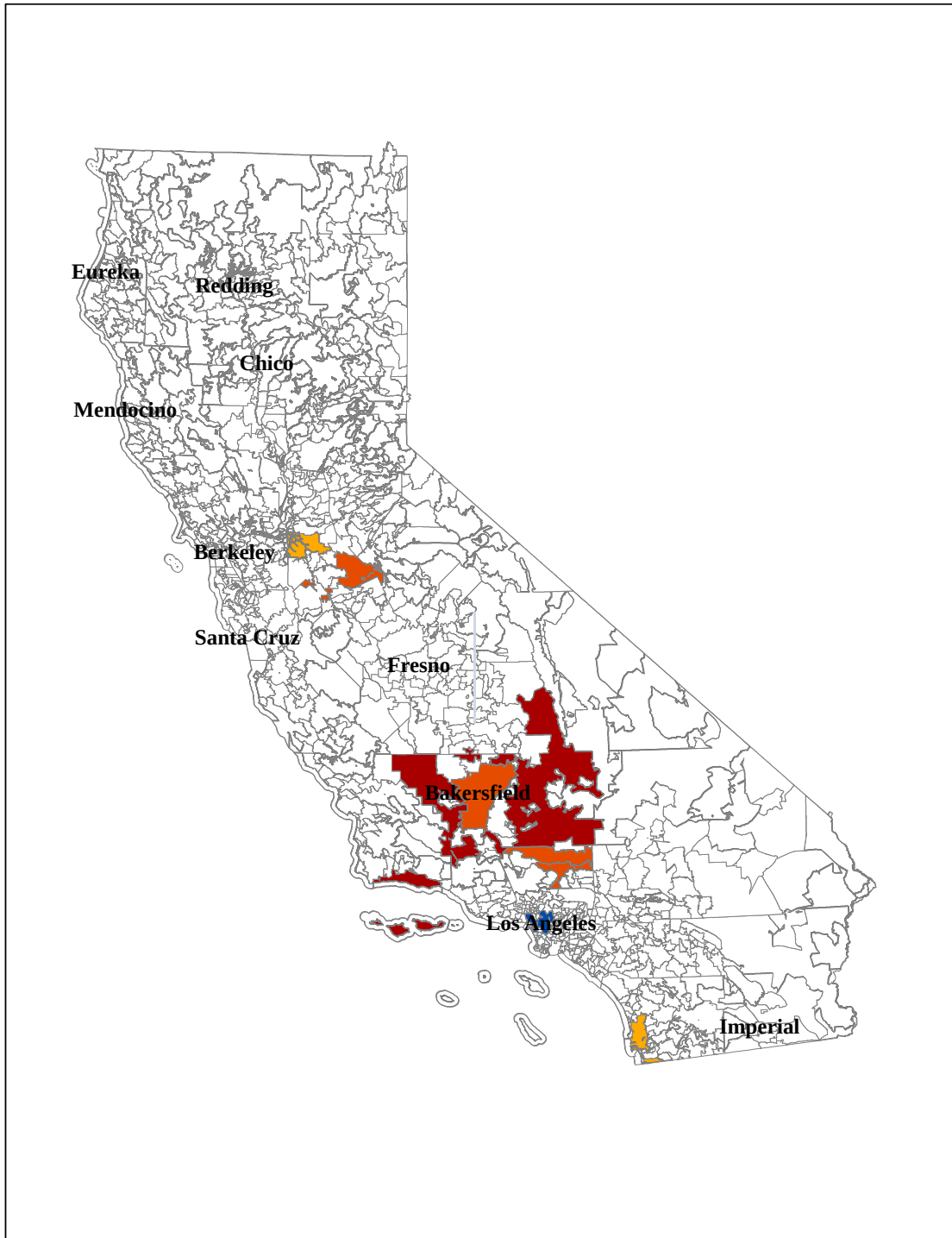


Image 37: Gang Homicide Data by City for the State of California in 2005

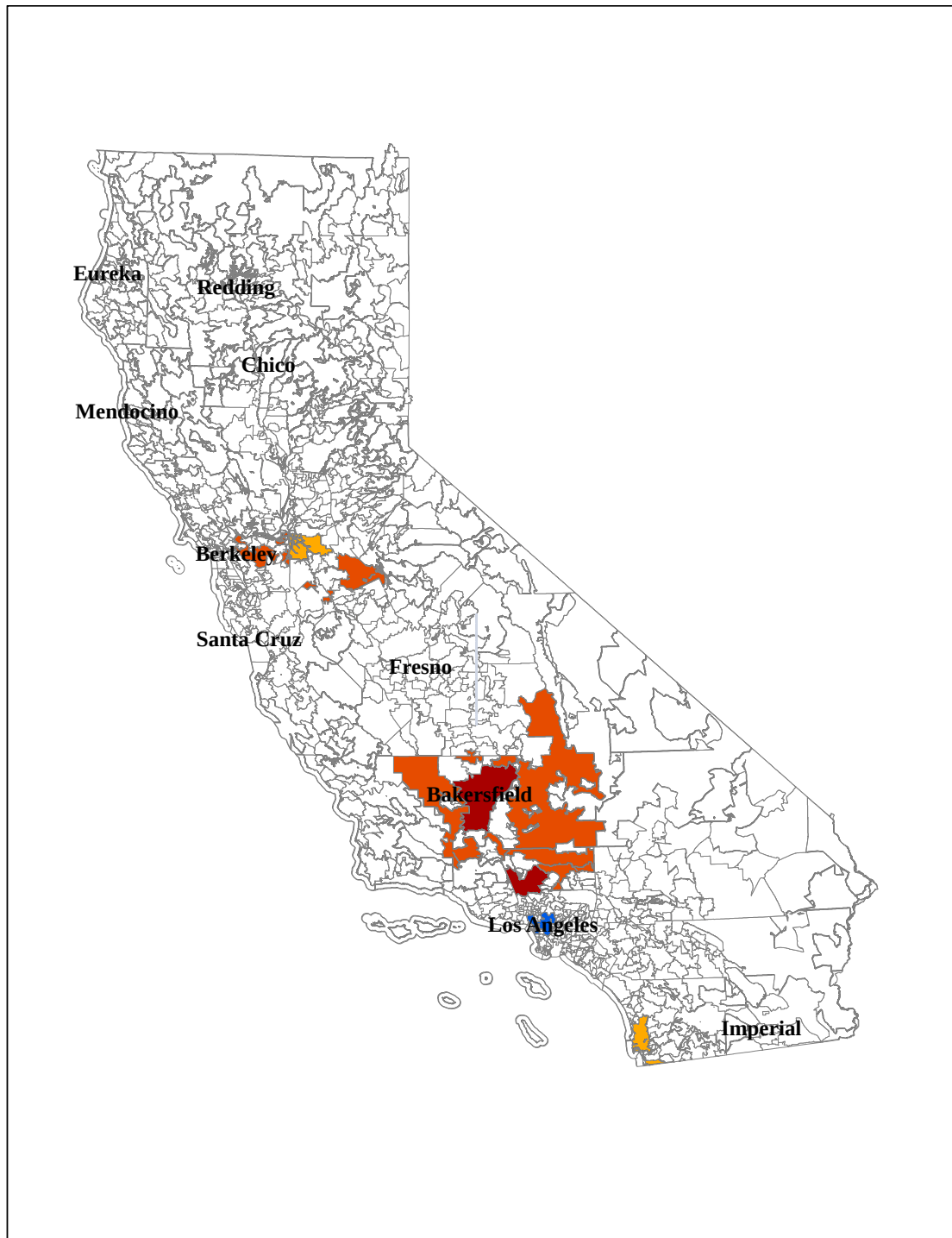


Image 38: Gang Homicide Data by City for the State of California in 2006

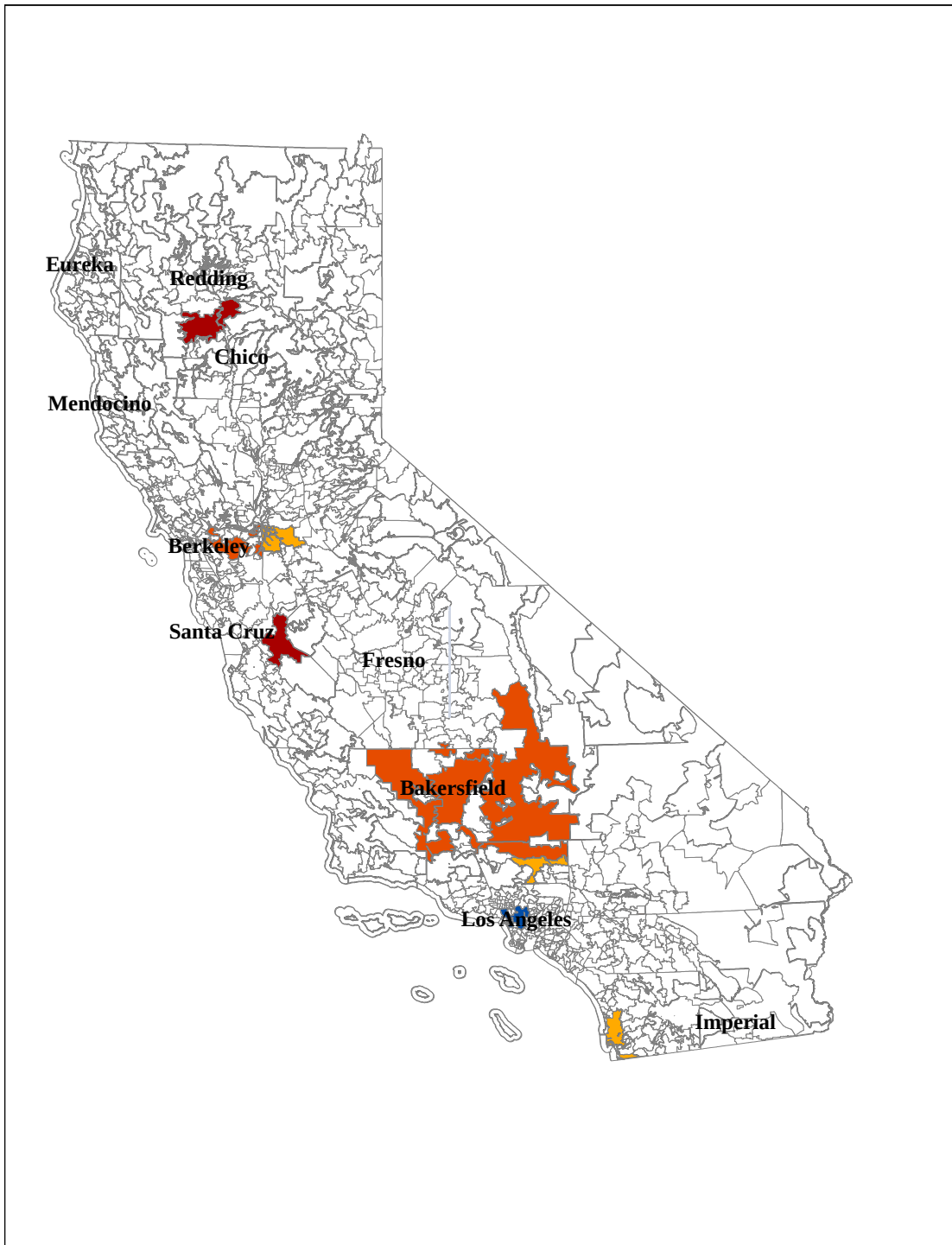
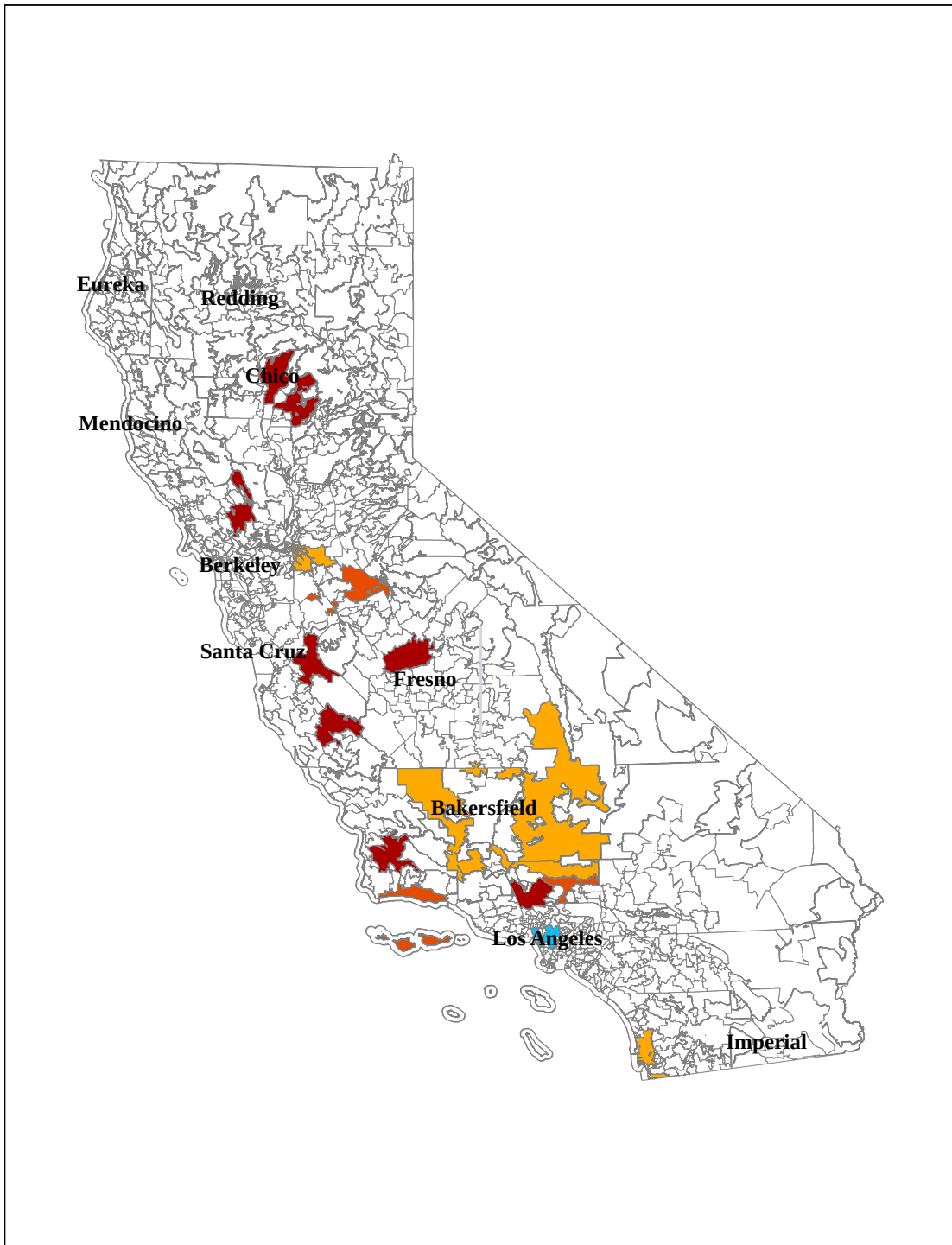


Image 39: Gang Homicide Data by City for the State of California in 2007



Appendix 3: Los Angeles County Geographic Diffusion Analysis

Image 40: Los Angeles County Cities for Geographic Reference

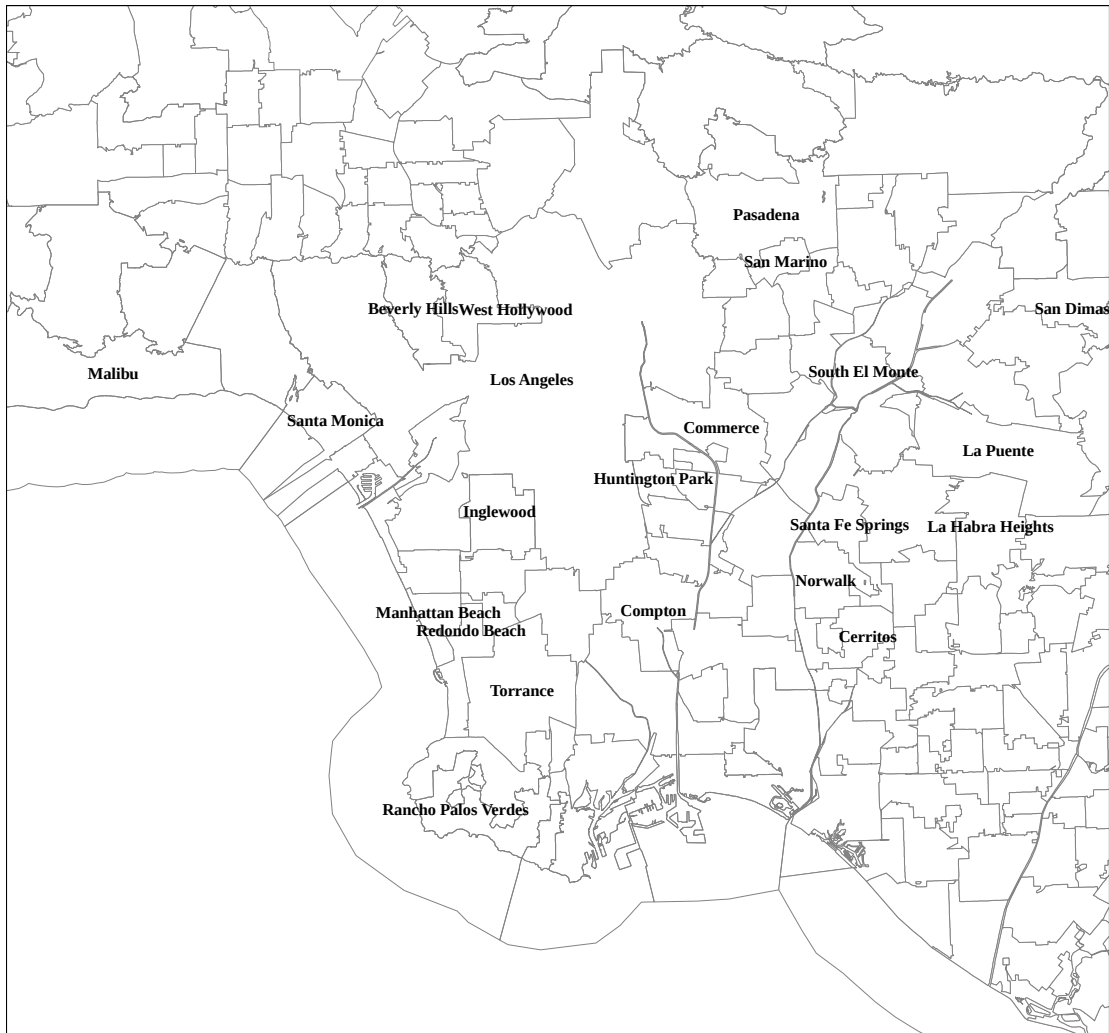


Image 41: Size Gradient Representing Number of Gang Homicides, and Color Gradient of City Populations, Used in Geographic Information Analysis of Los Angeles County

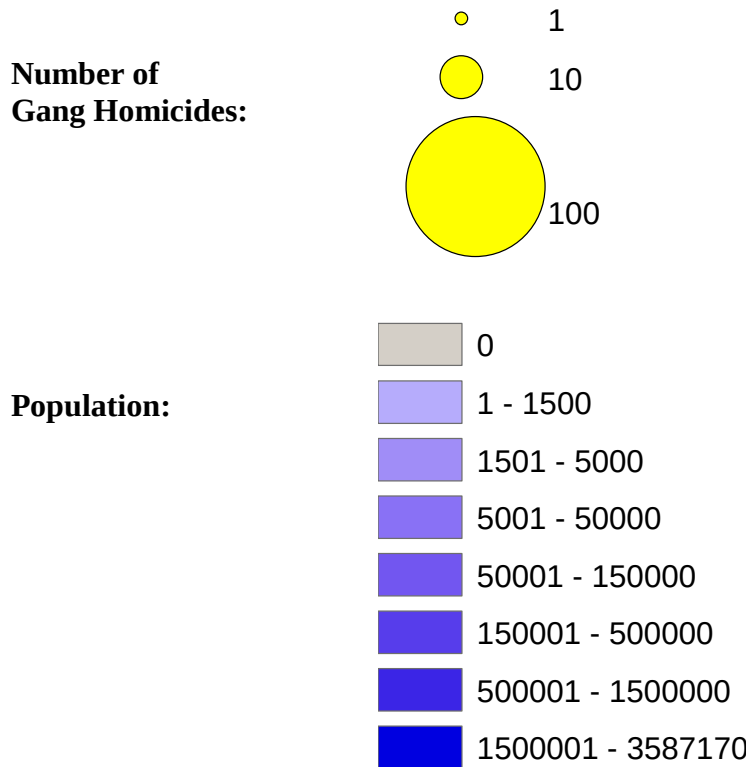


Image 42: Gang Homicide and Population Data by City for Los Angeles County in 1976

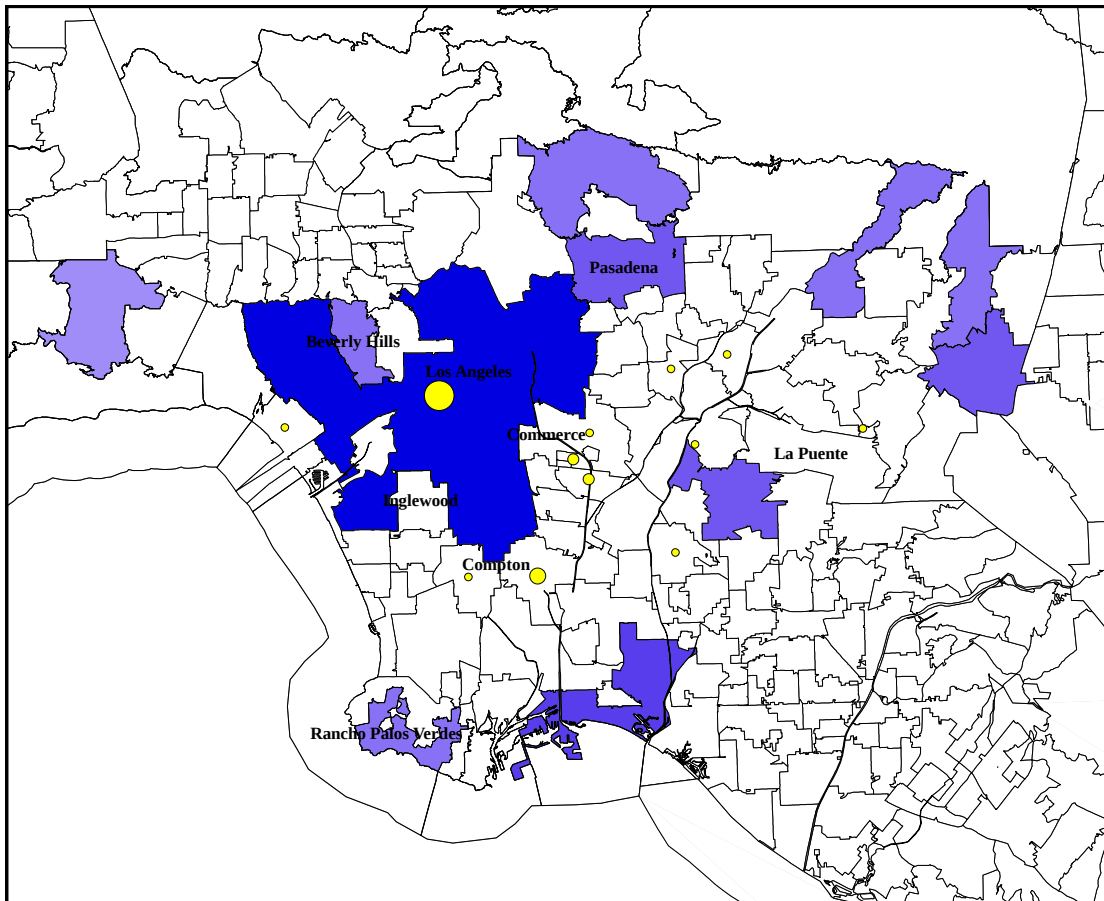


Image 43: Gang Homicide and Population Data by City for Los Angeles County in 1977

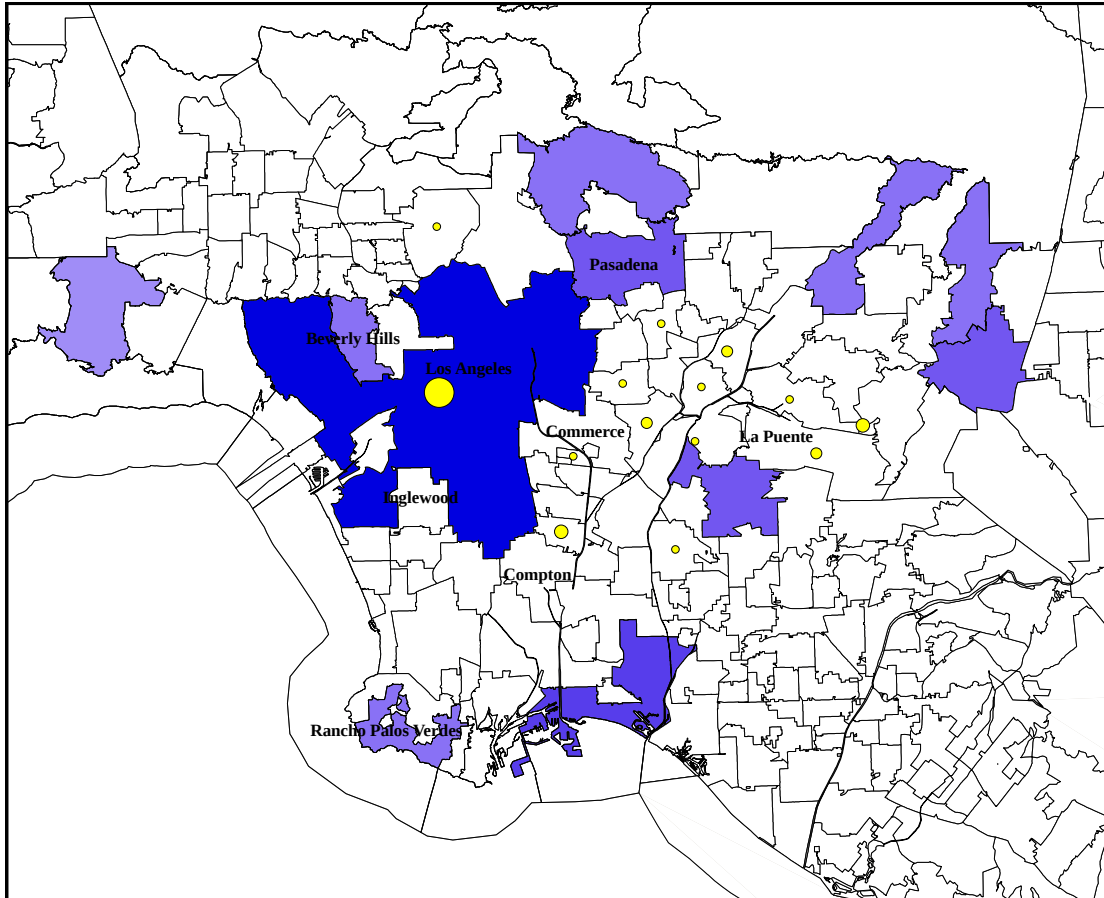


Image 44: Gang Homicide and Population Data by City for Los Angeles County in 1978

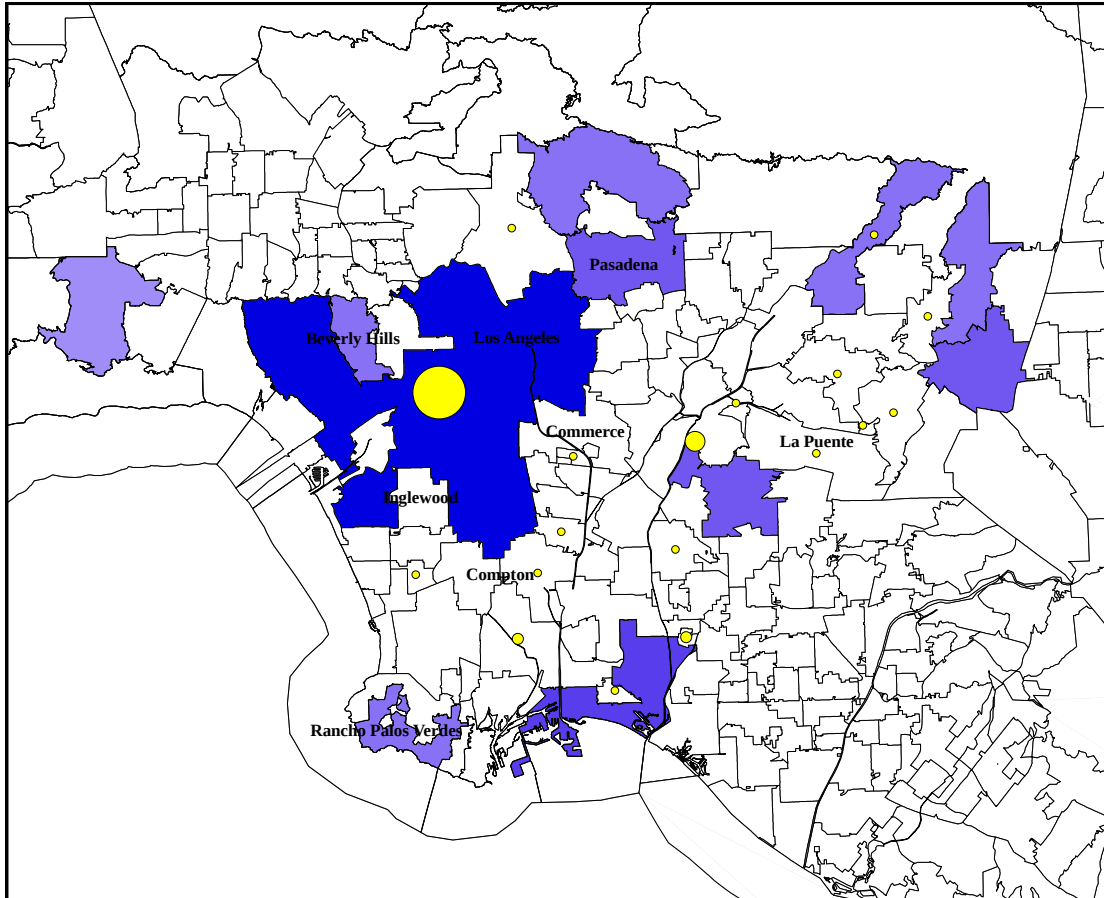


Image 45: Gang Homicide and Population Data by City for Los Angeles County in 1979

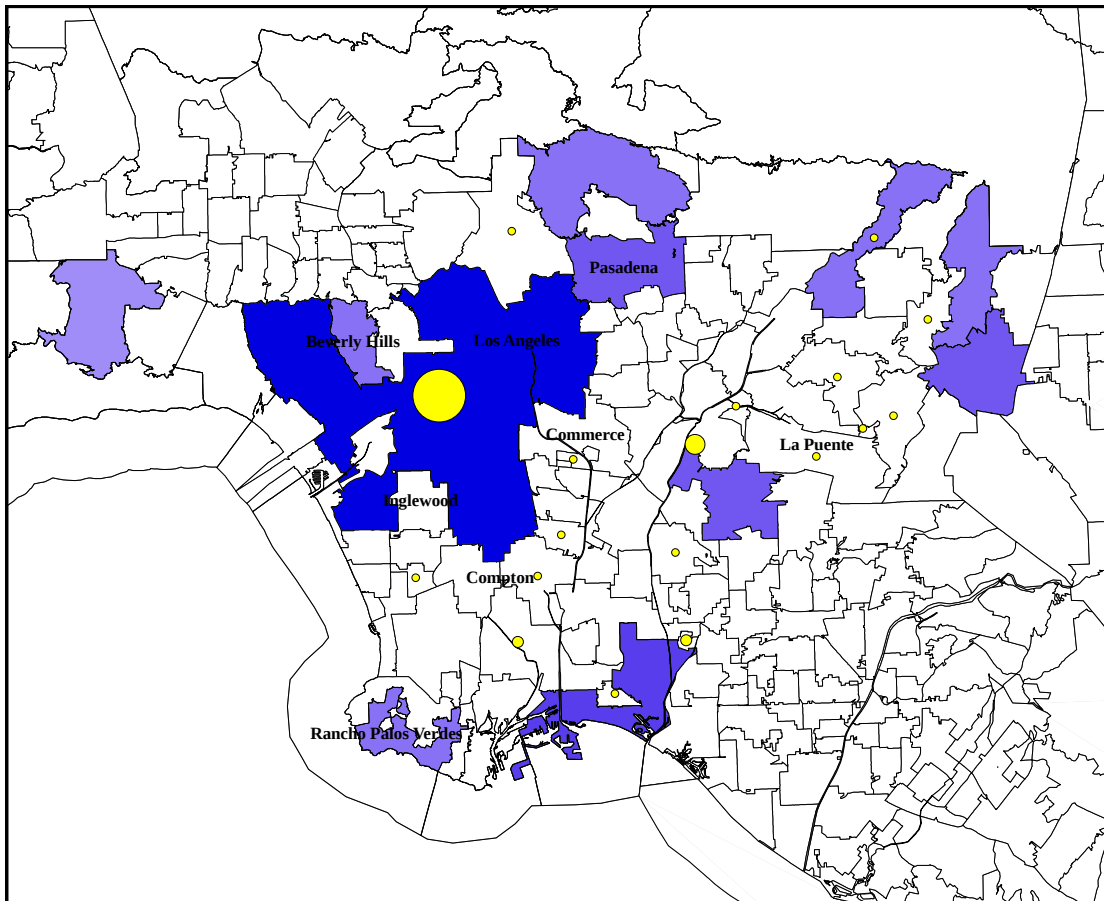


Image 46: Gang Homicide and Population Data by City for Los Angeles County in 1980

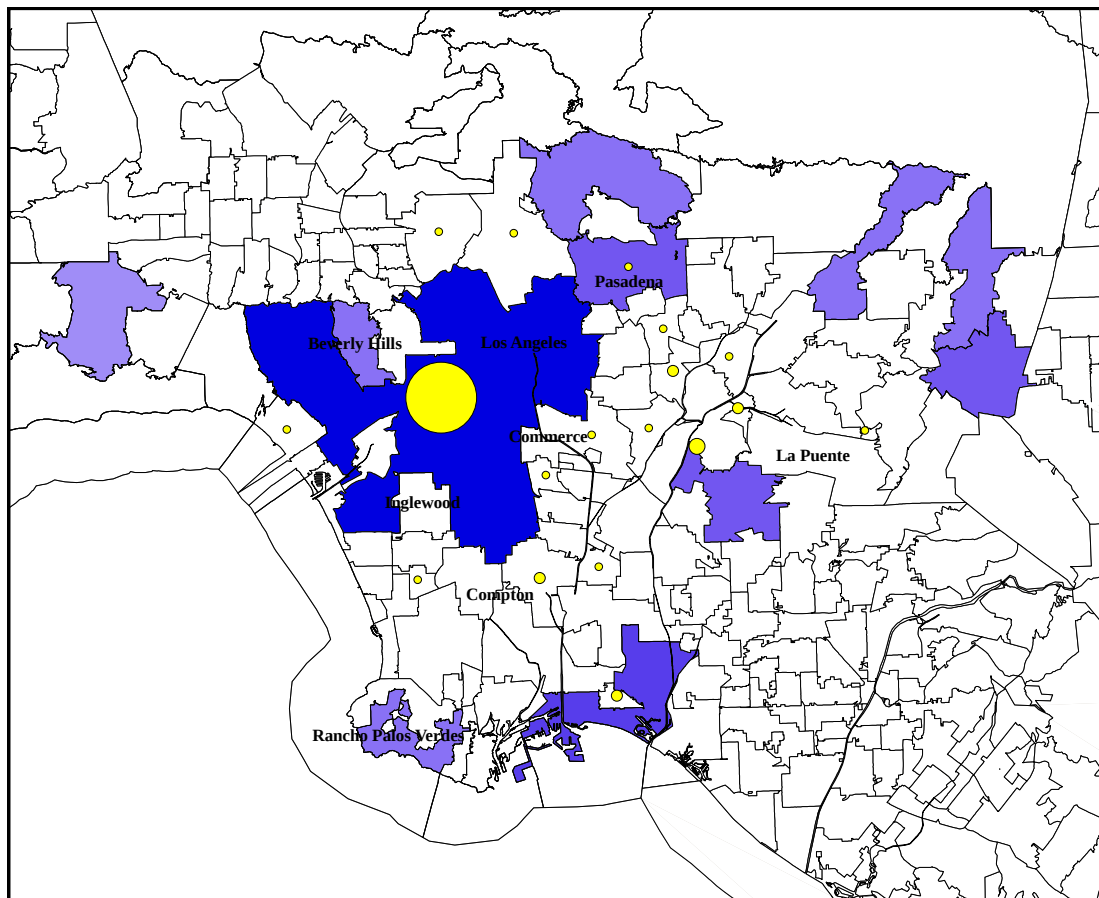


Image 47: Gang Homicide and Population Data by City for Los Angeles County in 1981

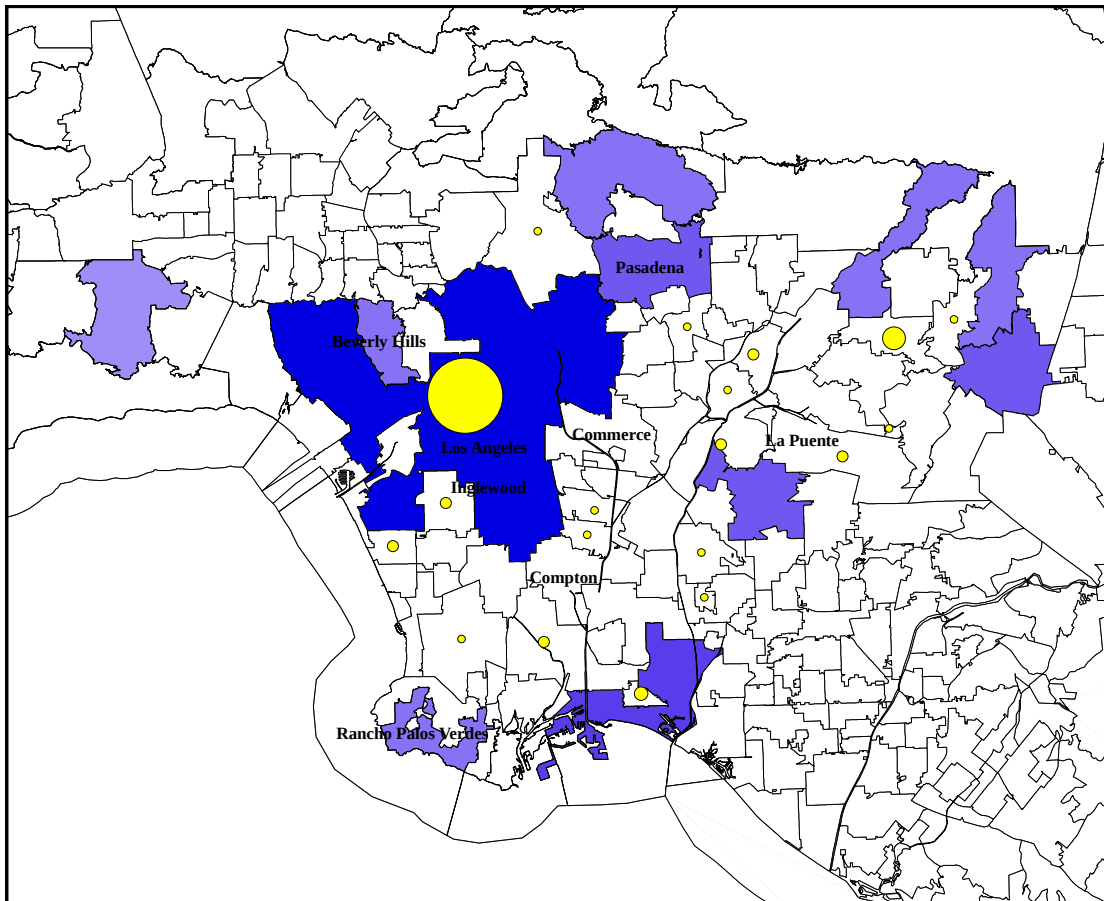


Image 48: Gang Homicide and Population Data by City for Los Angeles County in 1982

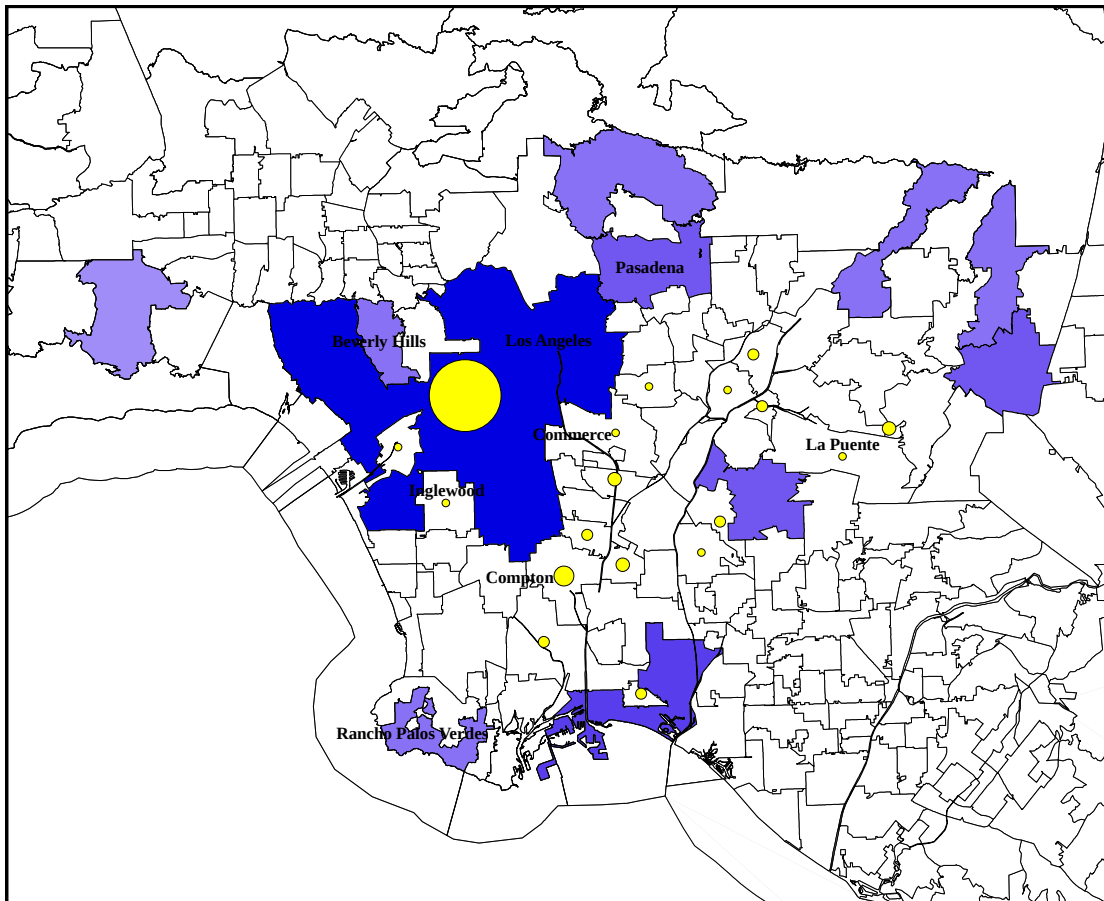


Image 49: Gang Homicide and Population Data by City for Los Angeles County in 1983

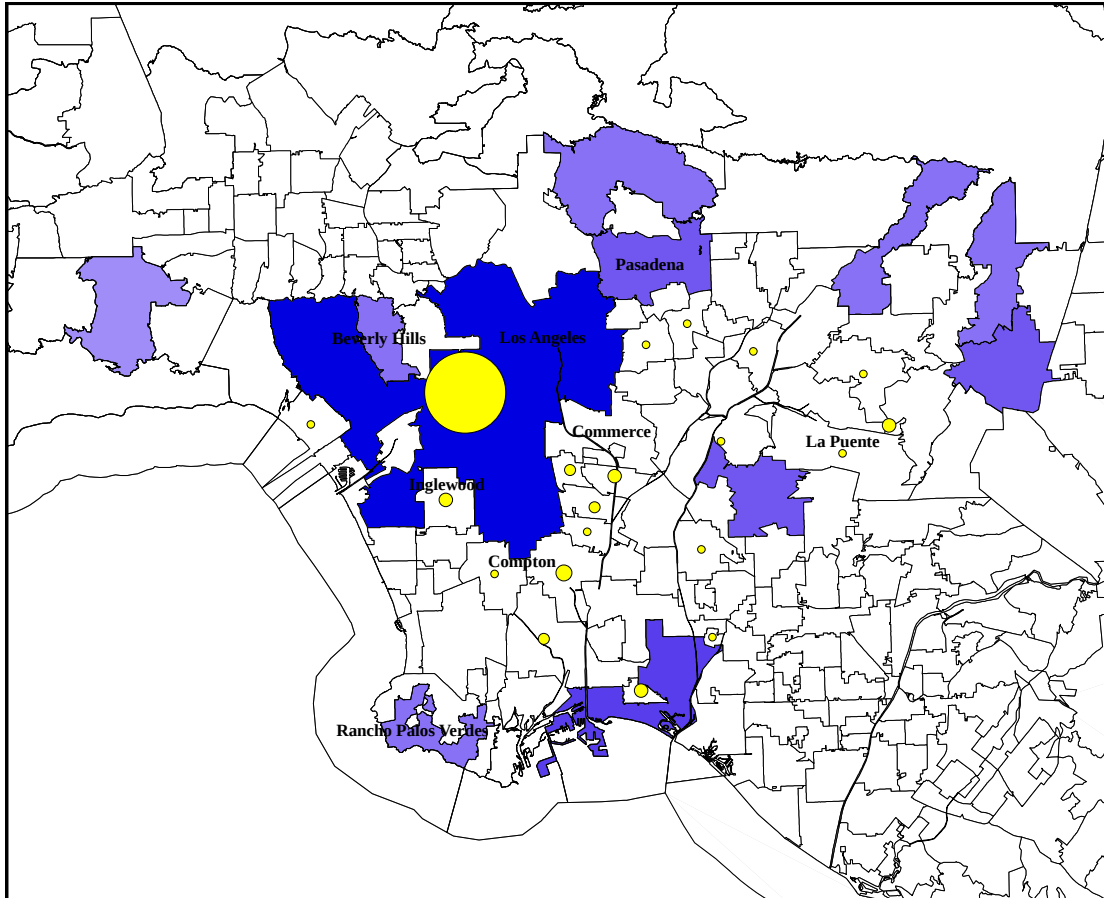


Image 50: Gang Homicide and Population Data by City for Los Angeles County in 1984

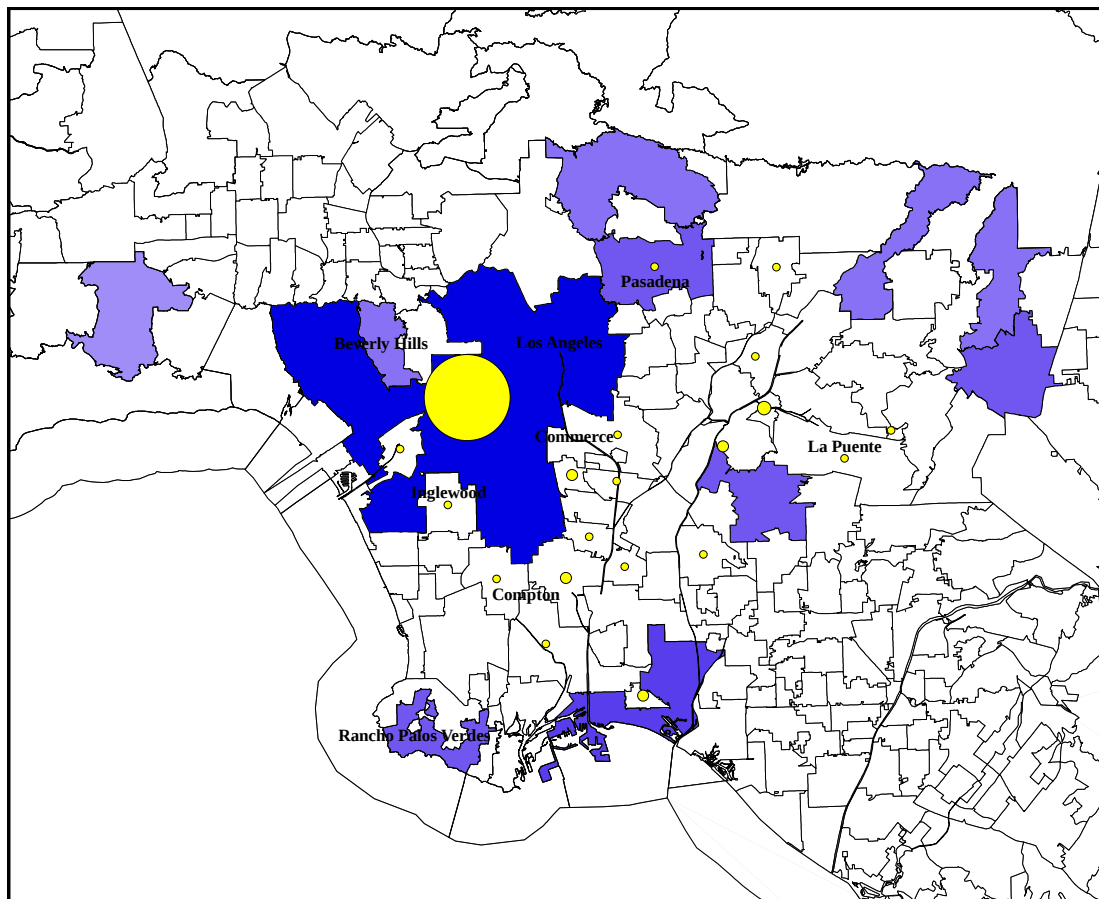


Image 51: Gang Homicide and Population Data by City for Los Angeles County in 1985

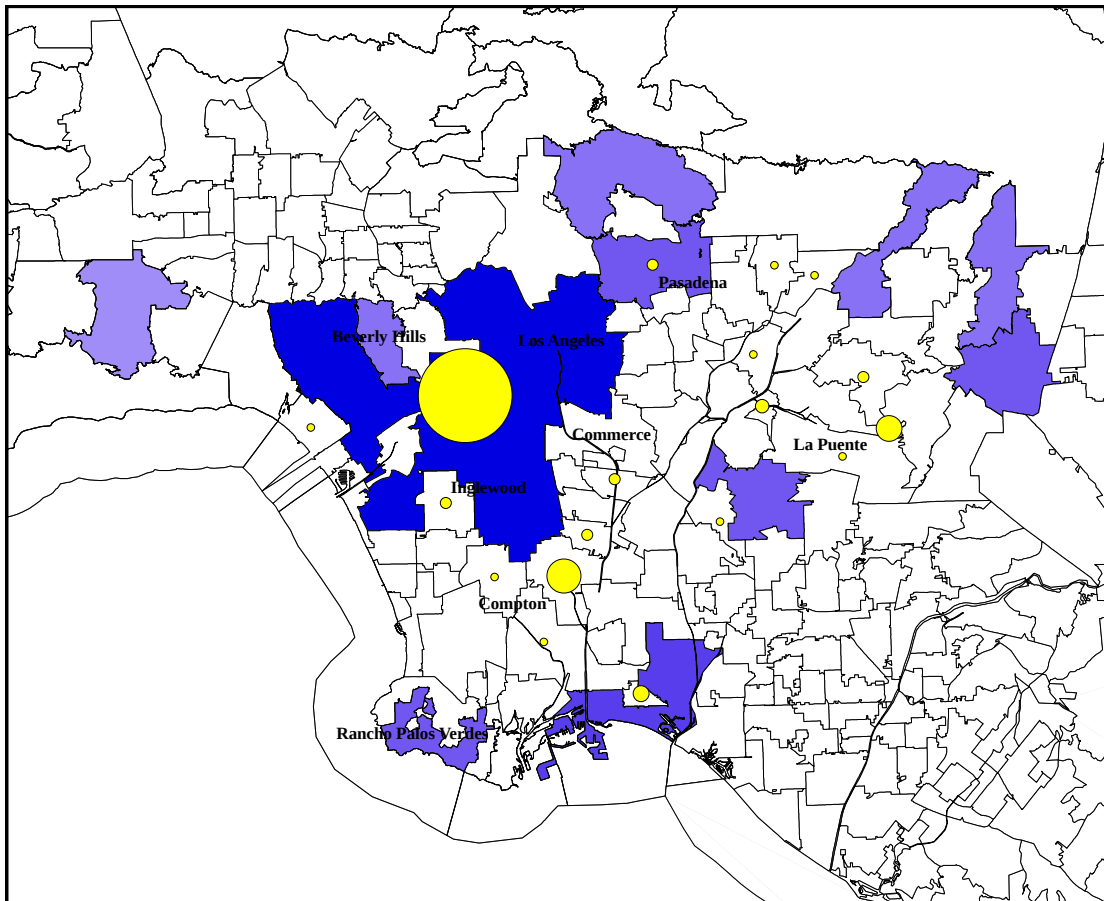


Image 52: Gang Homicide and Population Data by City for Los Angeles County in 1986

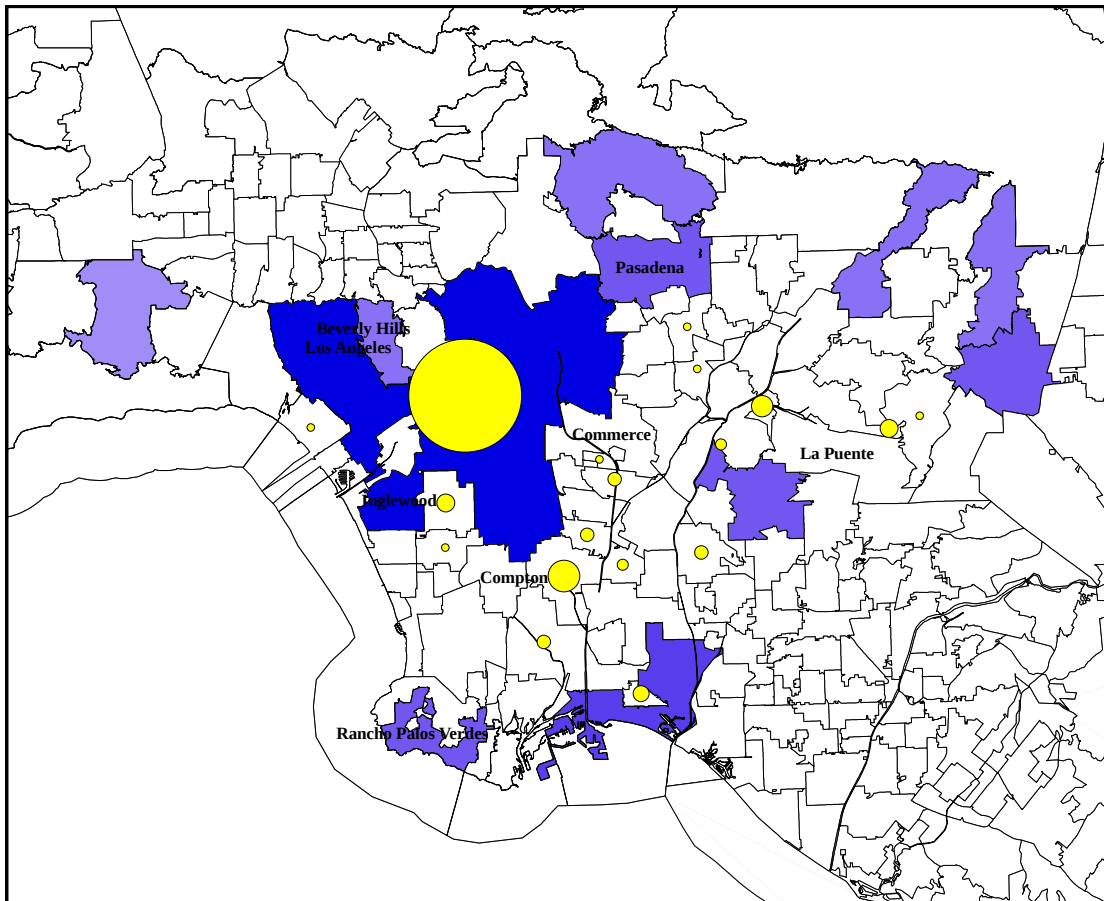


Image 53: Gang Homicide and Population Data by City for Los Angeles County in 1987

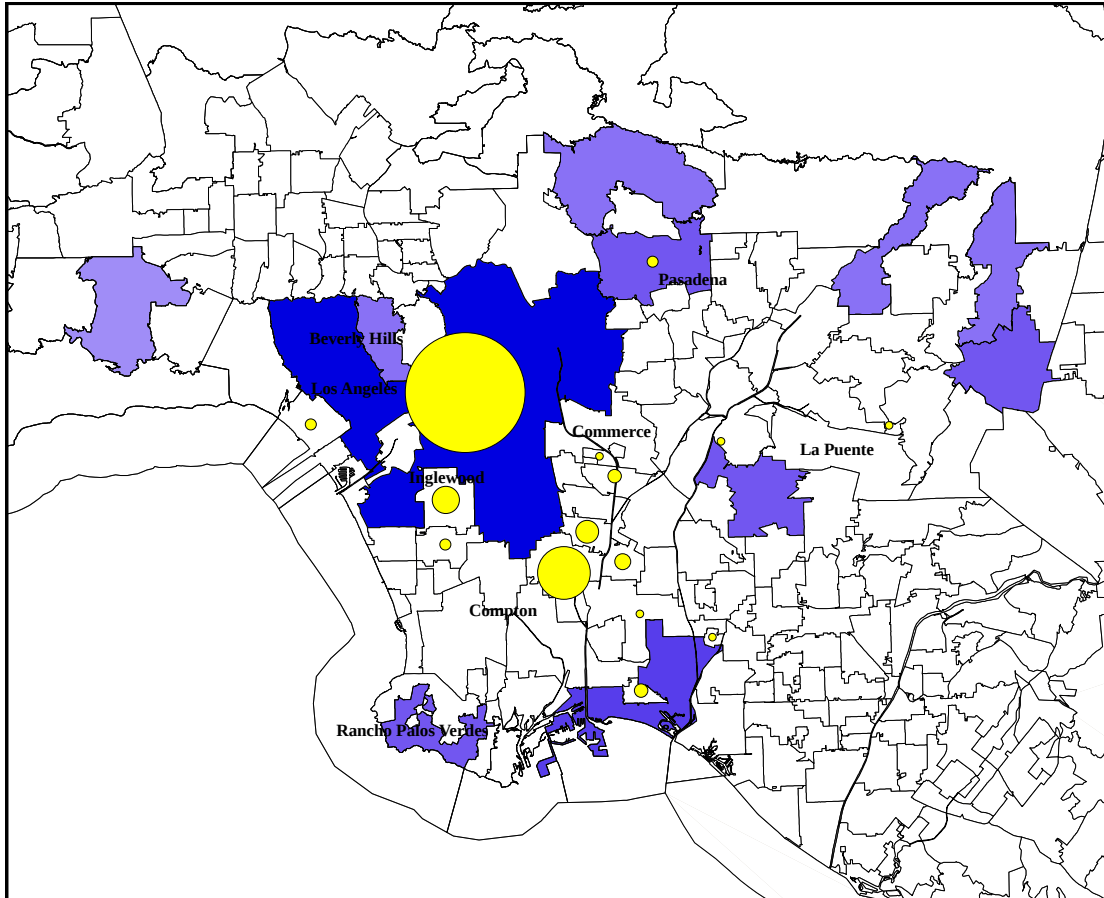


Image 54: Gang Homicide and Population Data by City for Los Angeles County in 1988

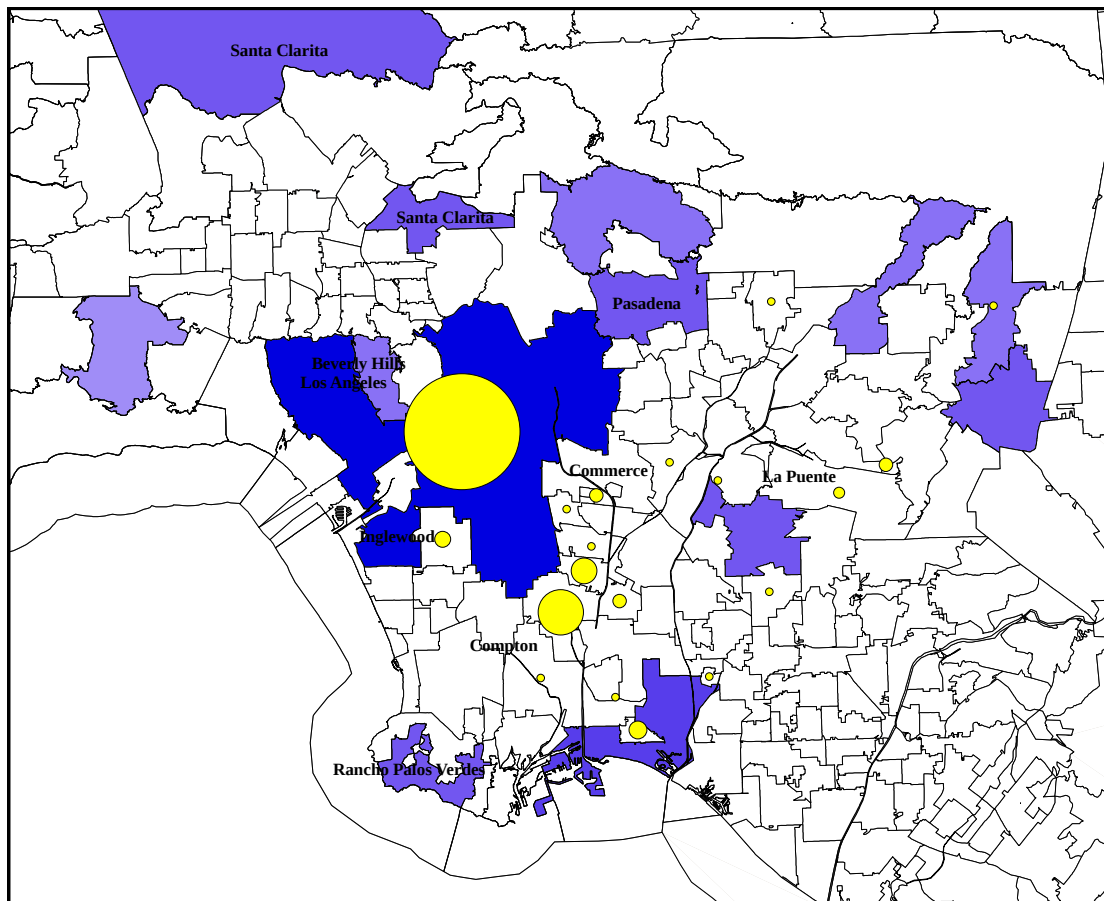


Image 55: Gang Homicide and Population Data by City for Los Angeles County in 1989

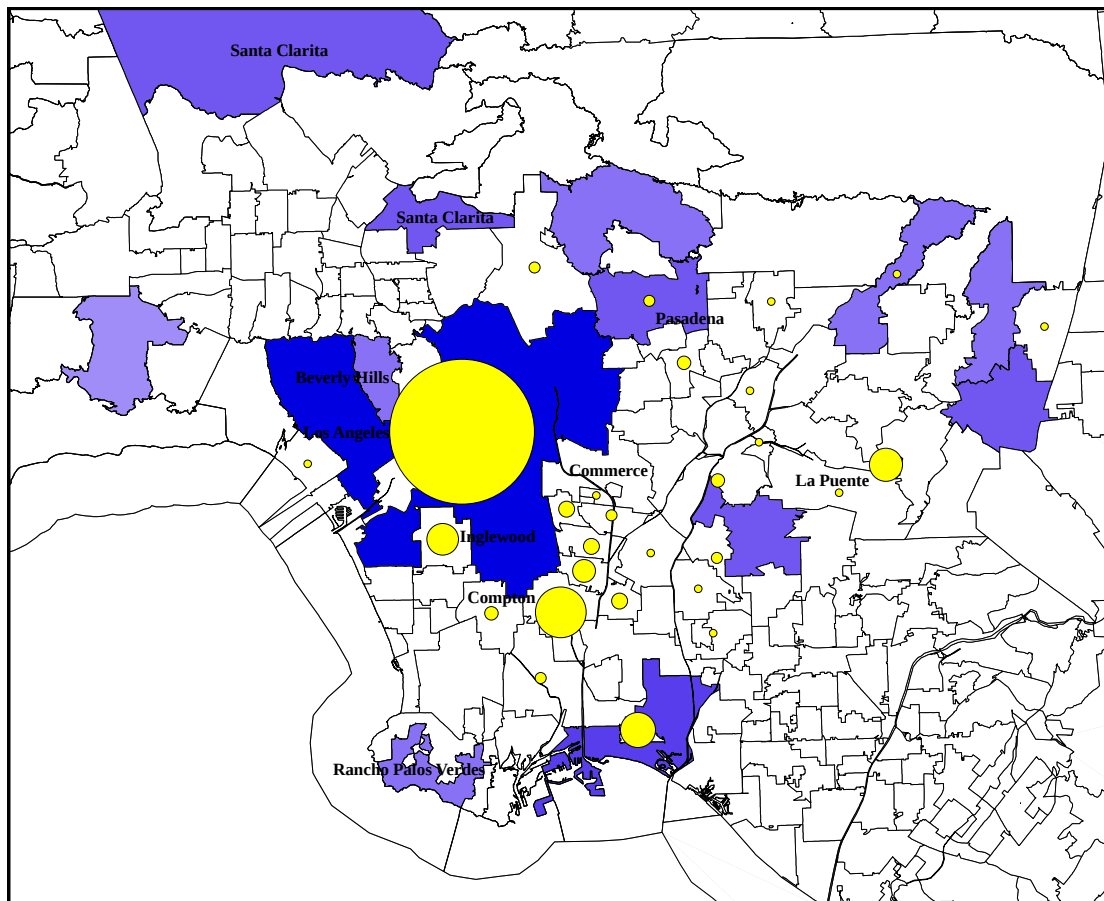


Image 56: Gang Homicide and Population Data by City for Los Angeles County in 1990

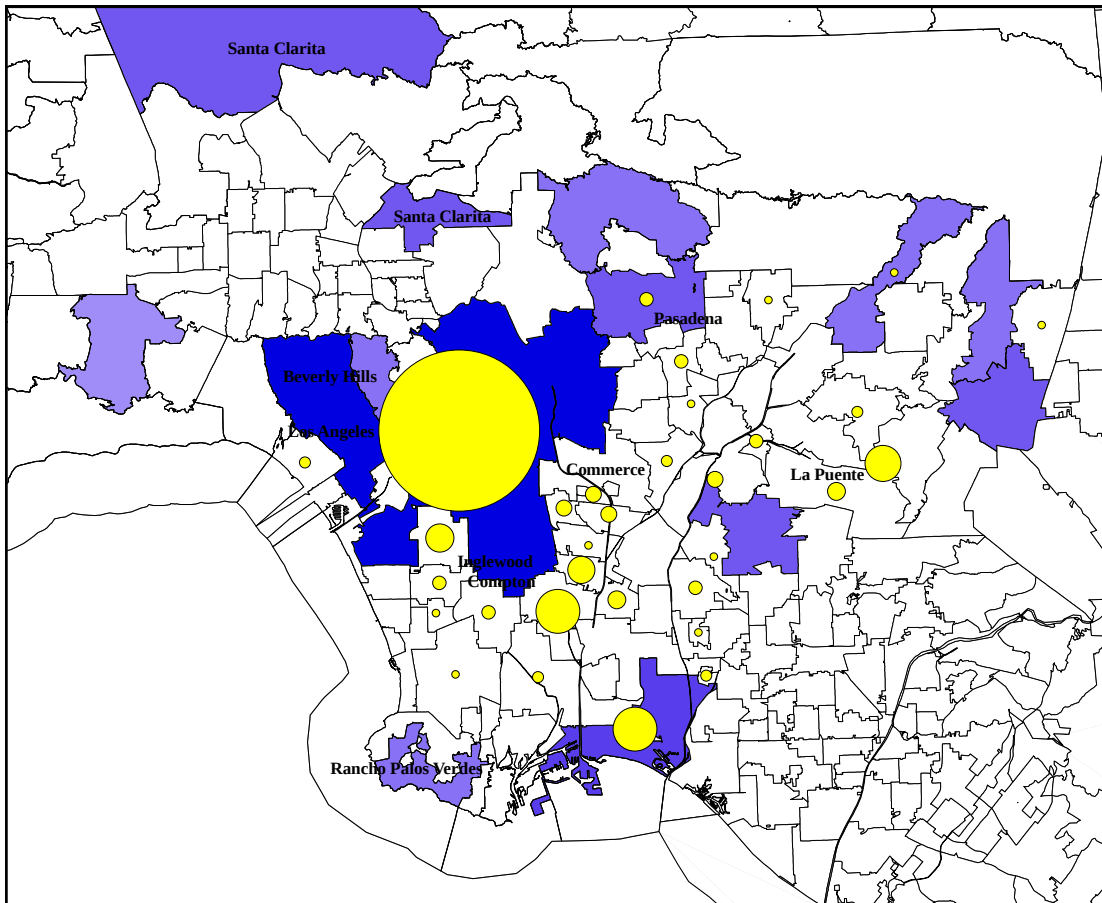


Image 57: Gang Homicide and Population Data by City for Los Angeles County in 1991

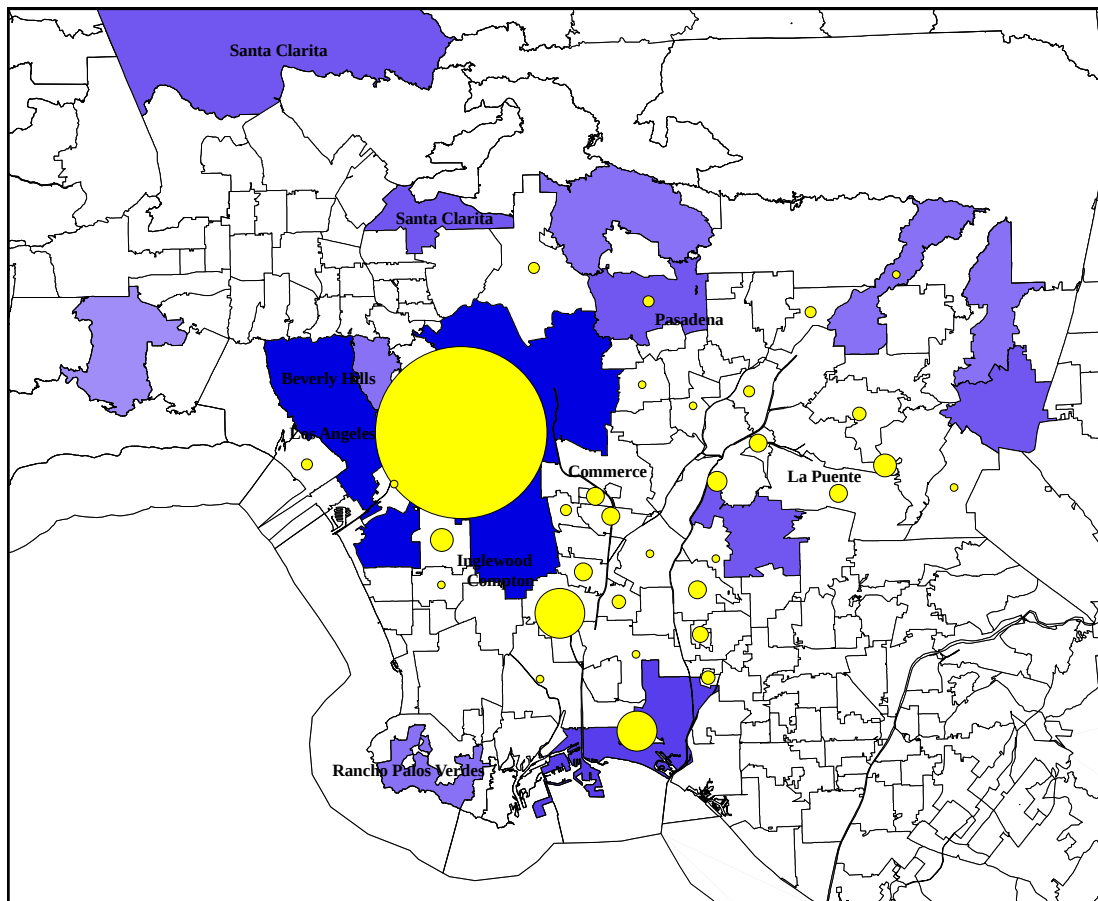


Image 58: Gang Homicide and Population Data by City for Los Angeles County in 1992

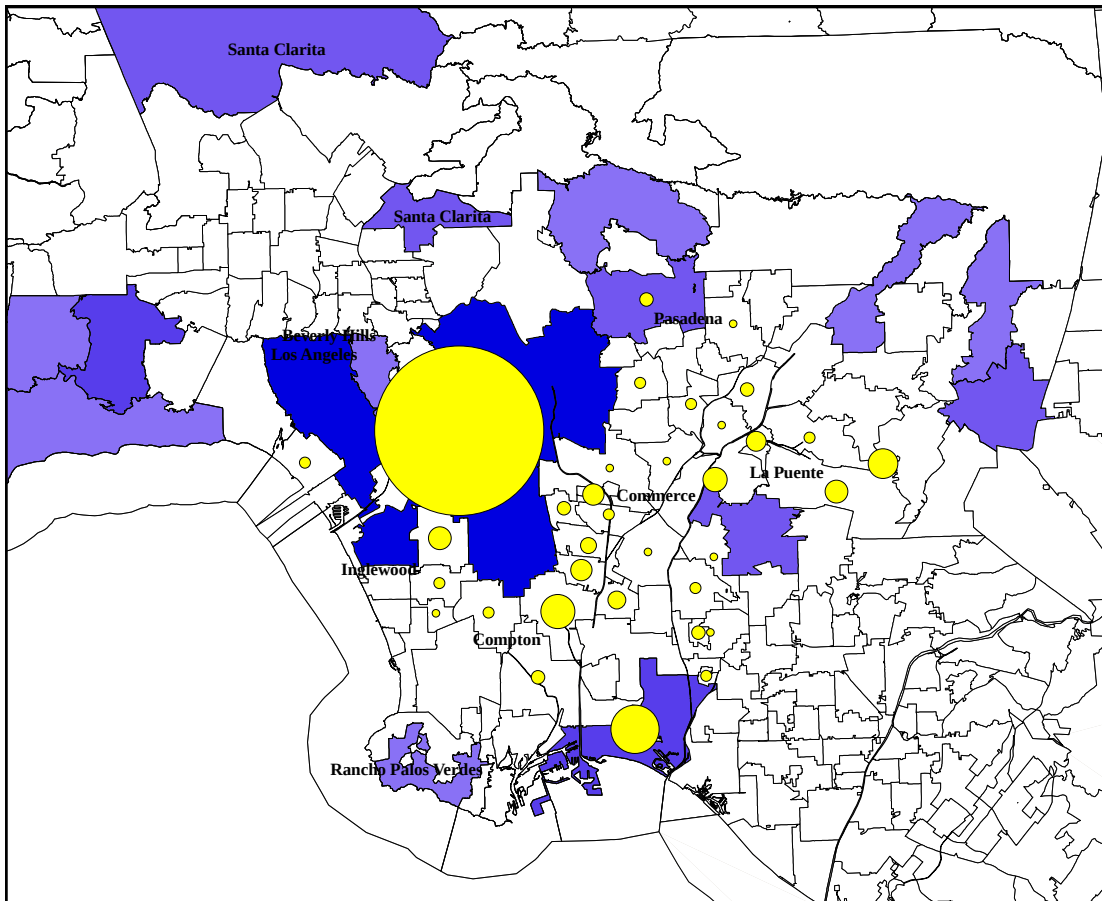


Image 59: Gang Homicide and Population Data by City for Los Angeles County in 1993

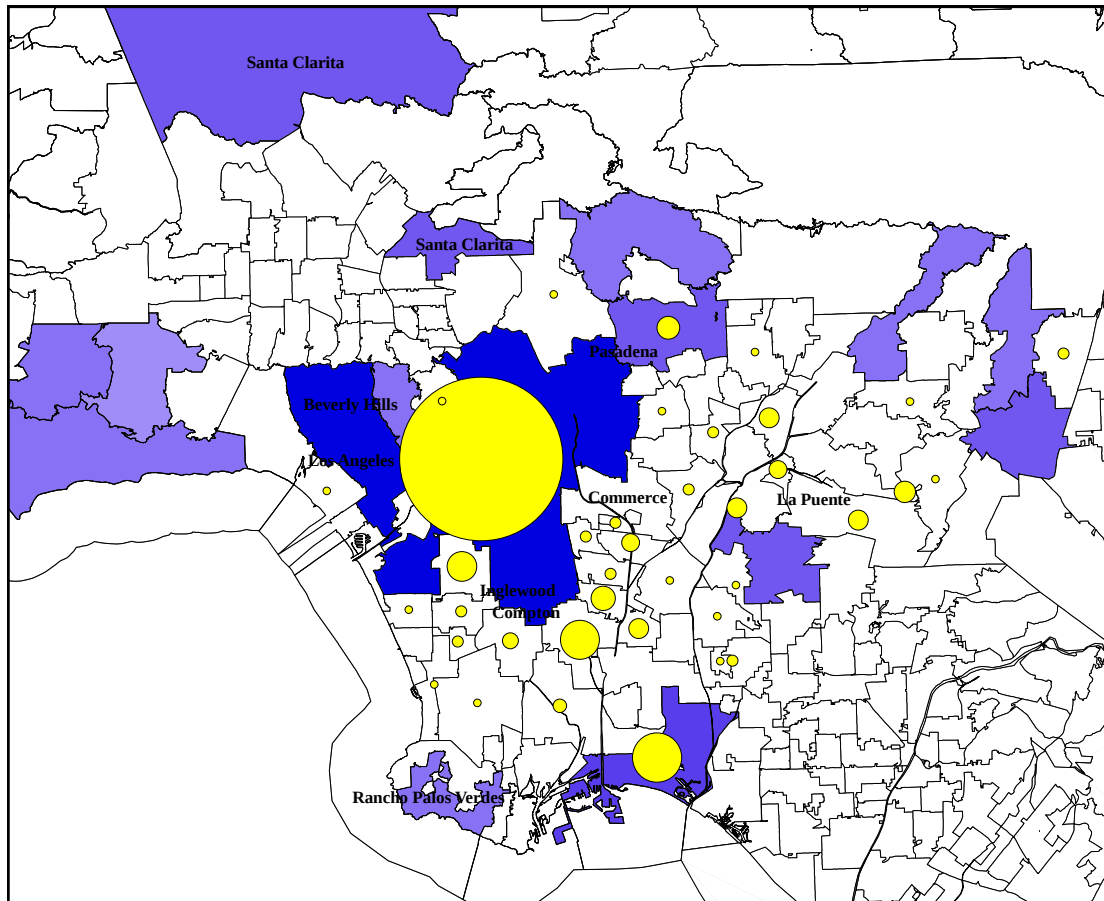


Image 60: Gang Homicide and Population Data by City for Los Angeles County in 1994

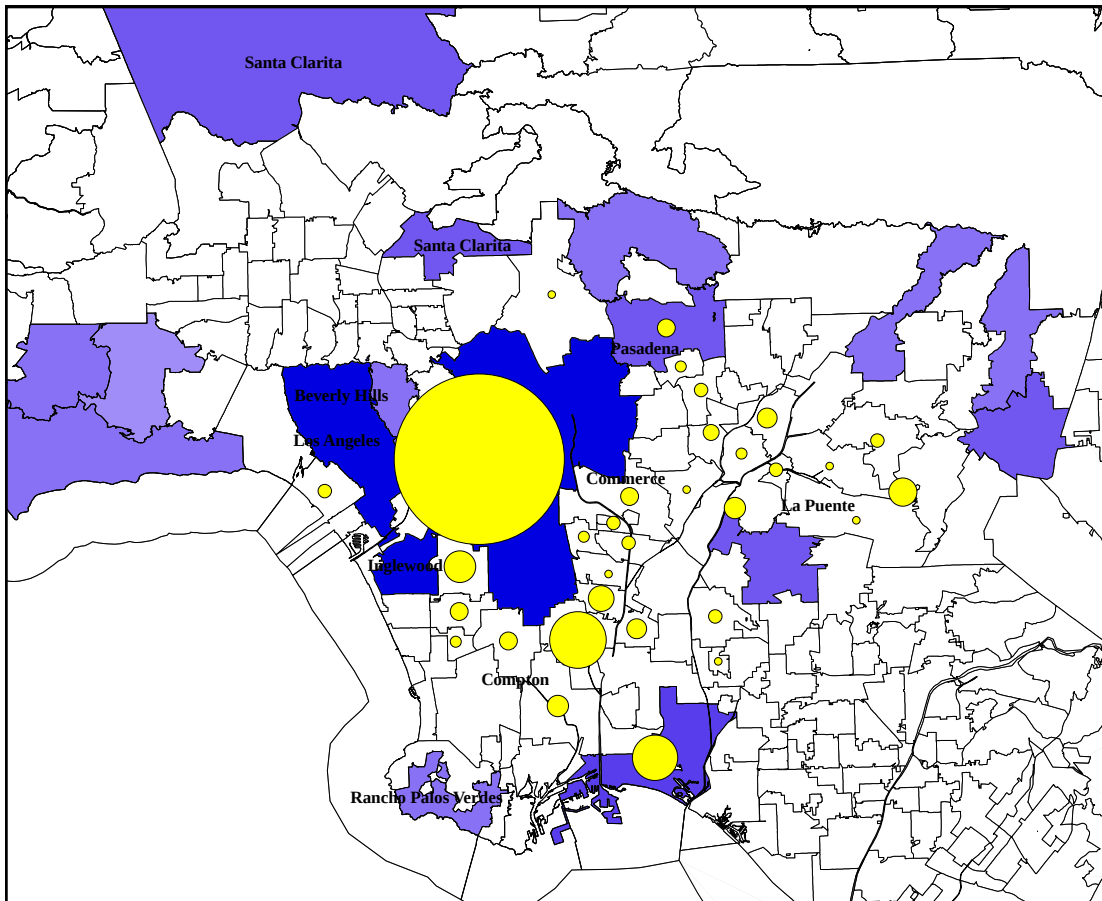


Image 61: Gang Homicide and Population Data by City for Los Angeles County in 1995

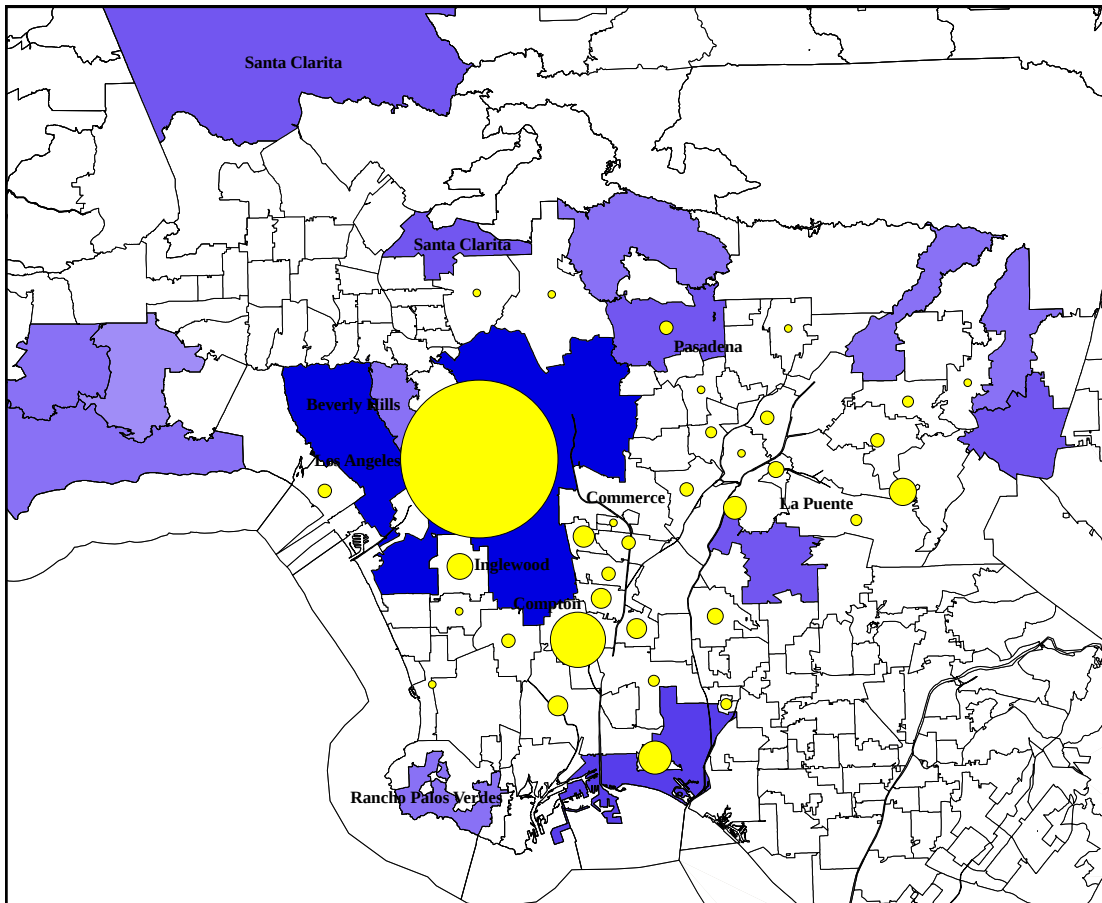


Image 62: Gang Homicide and Population Data by City for Los Angeles County in 1996

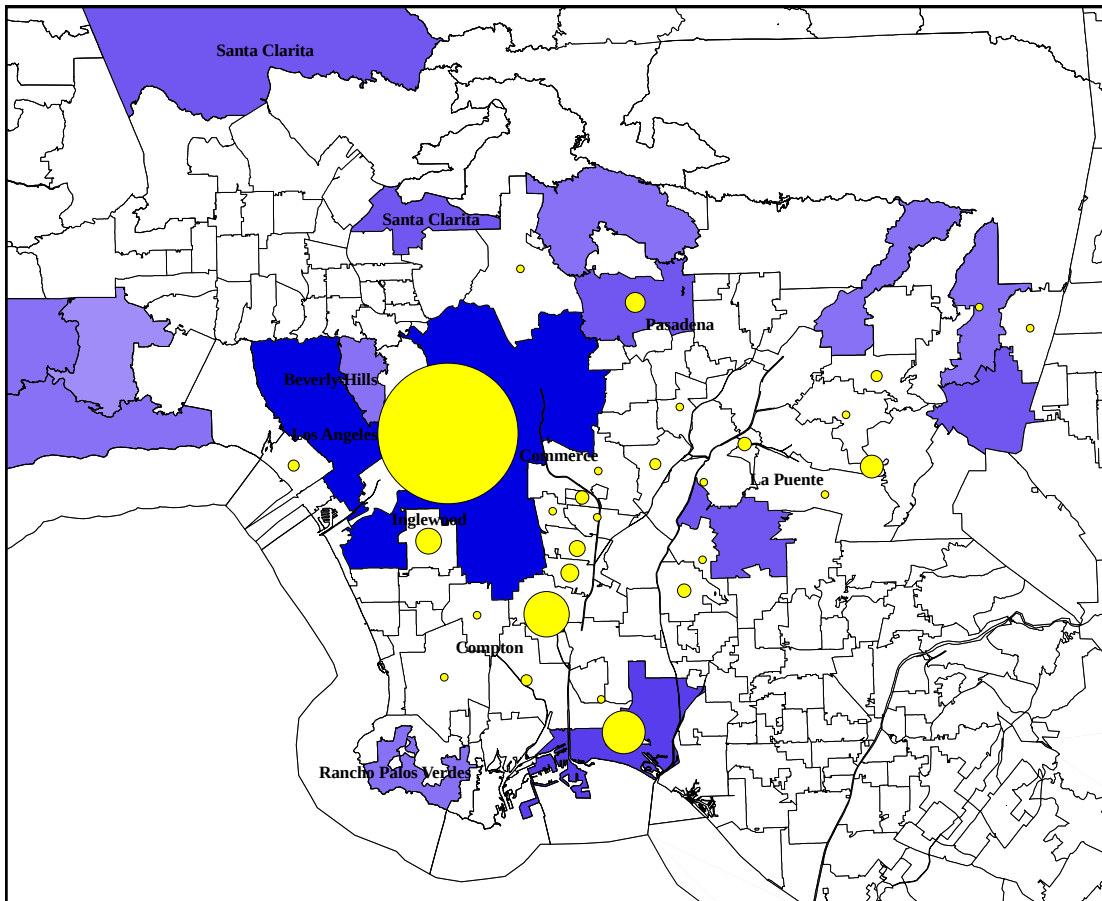


Image 63: Gang Homicide and Population Data by City for Los Angeles County in 1997

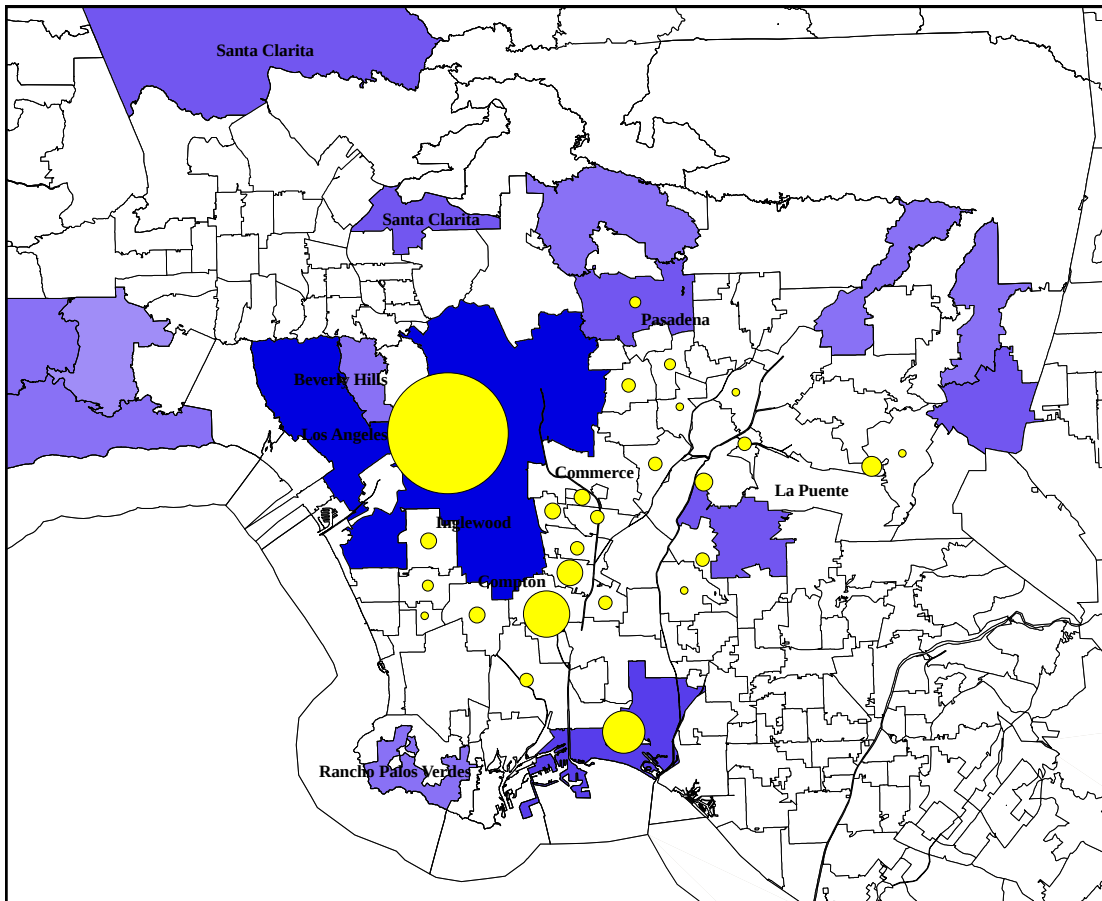


Image 64: Gang Homicide and Population Data by City for Los Angeles County in 1998

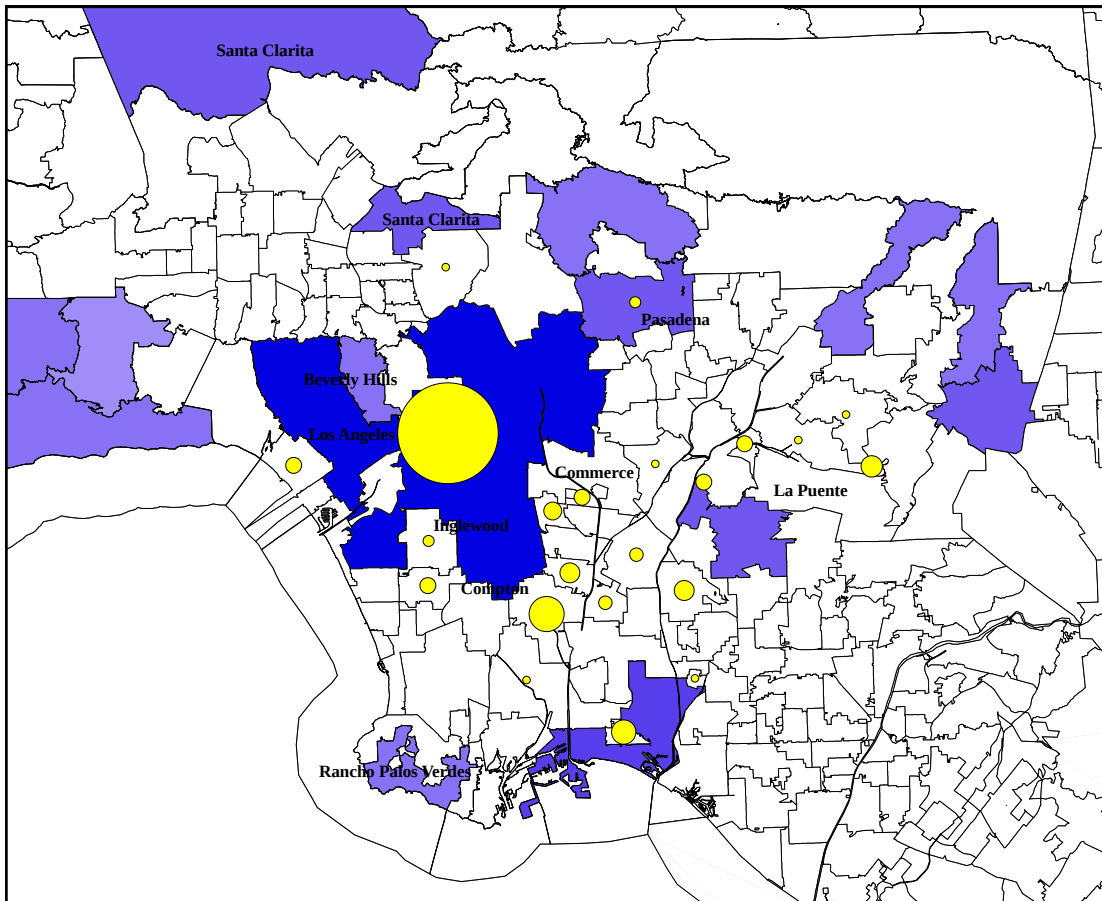


Image 65: Gang Homicide and Population Data by City for Los Angeles County in 1999

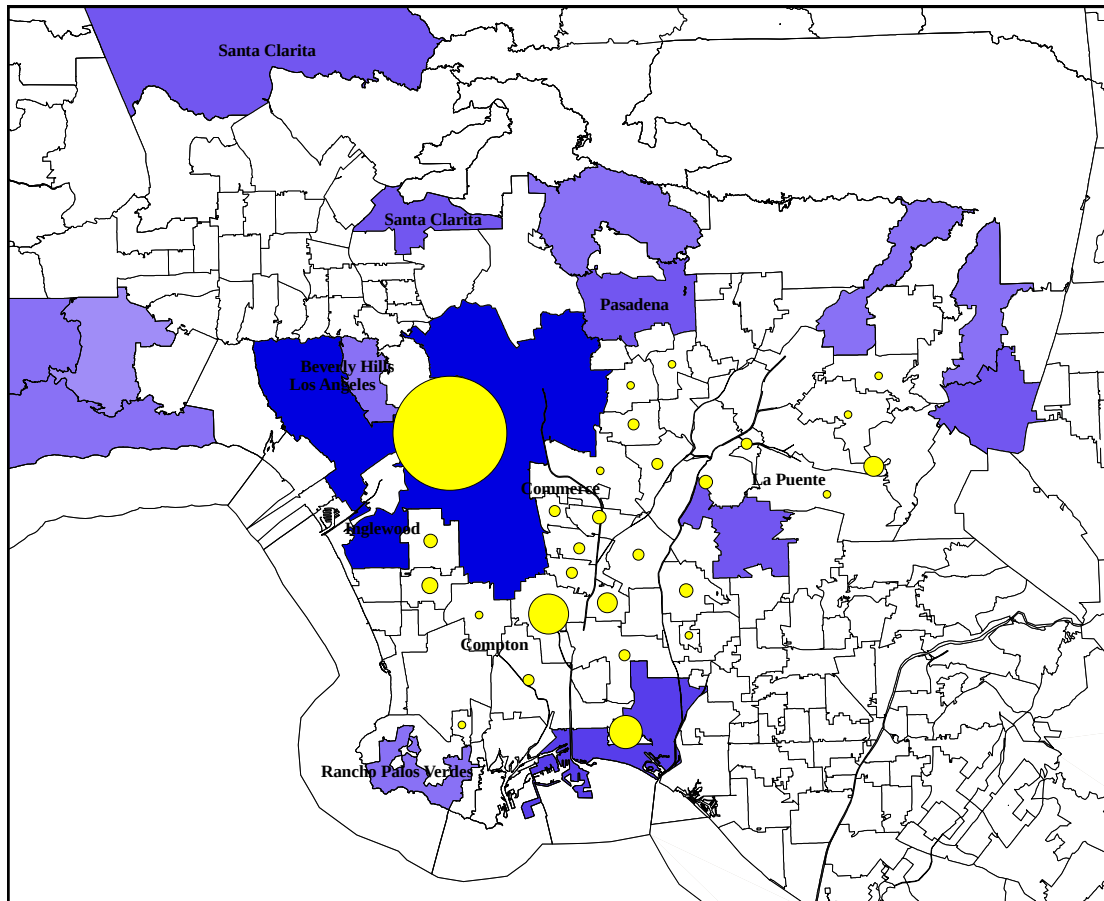


Image 66: Gang Homicide and Population Data by City for Los Angeles County in 2000

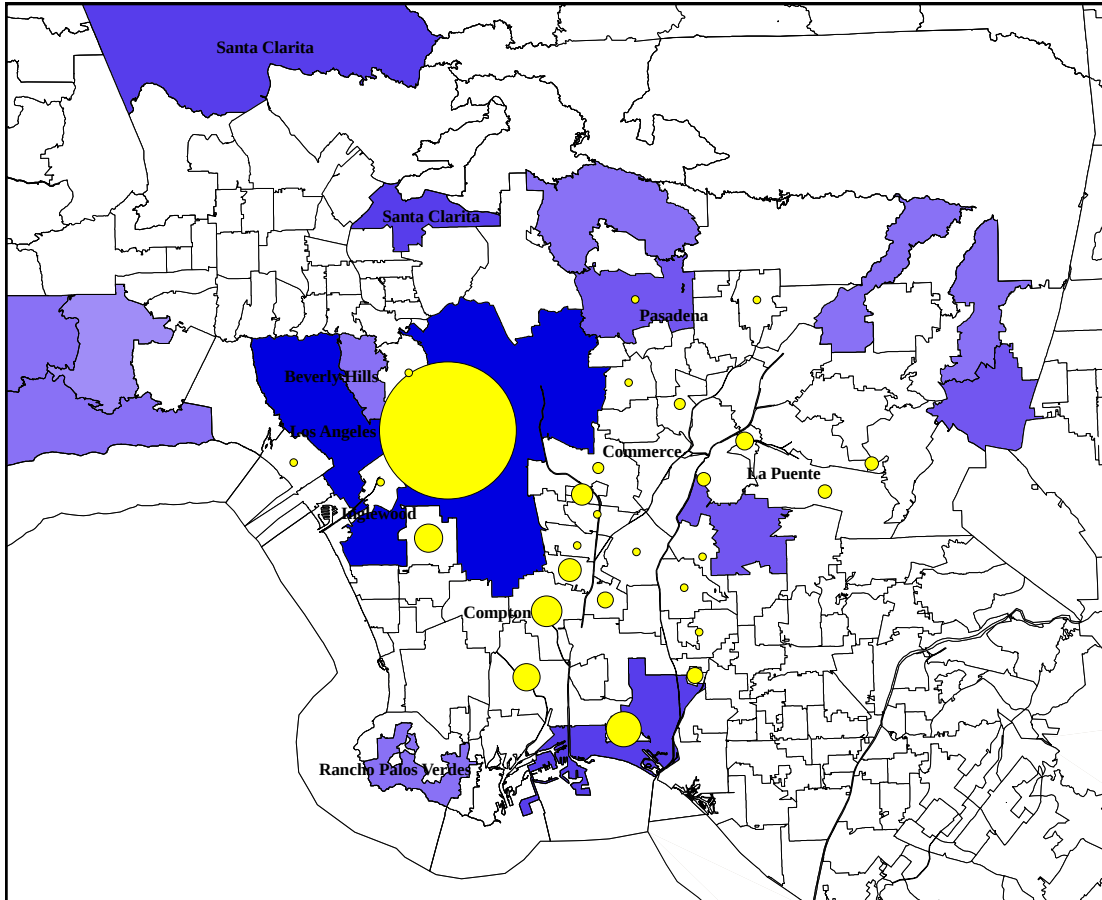


Image 67: Gang Homicide and Population Data by City for Los Angeles County in 2001

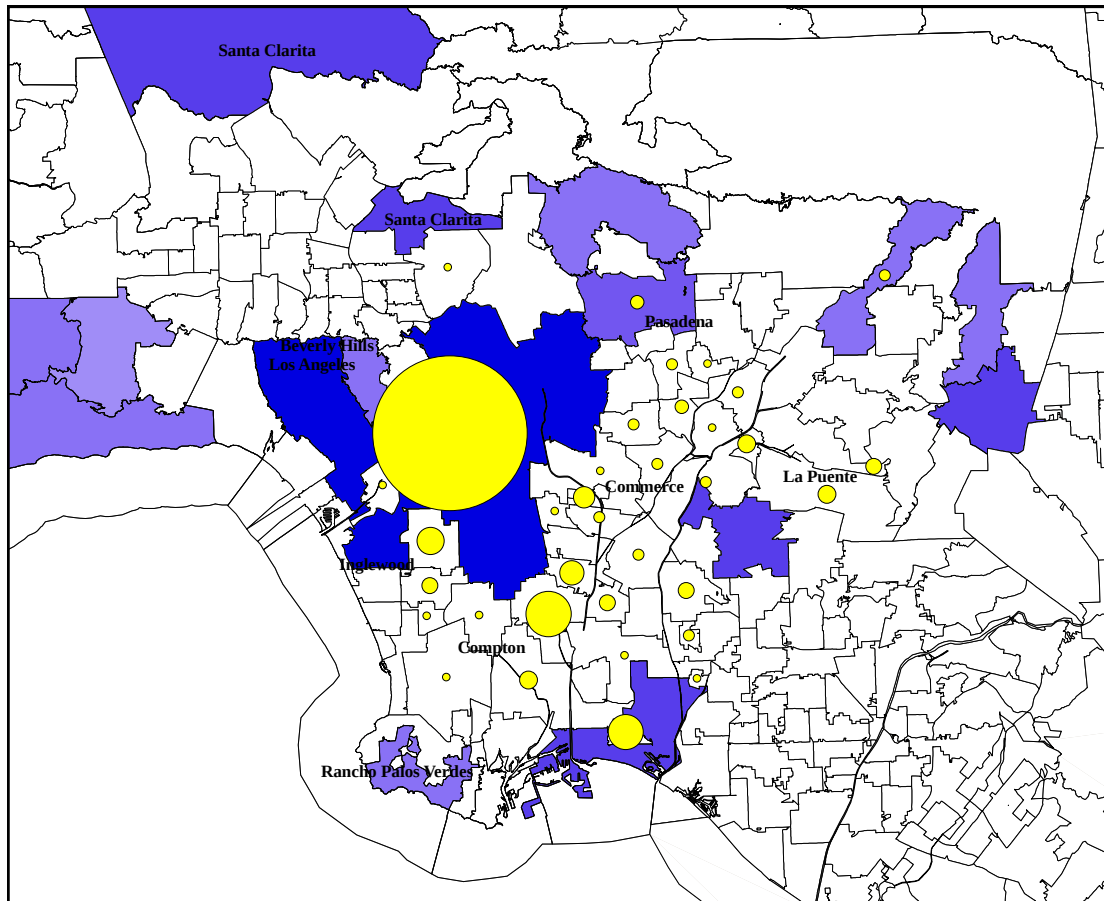


Image 68: Gang Homicide and Population Data by City for Los Angeles County in 2002

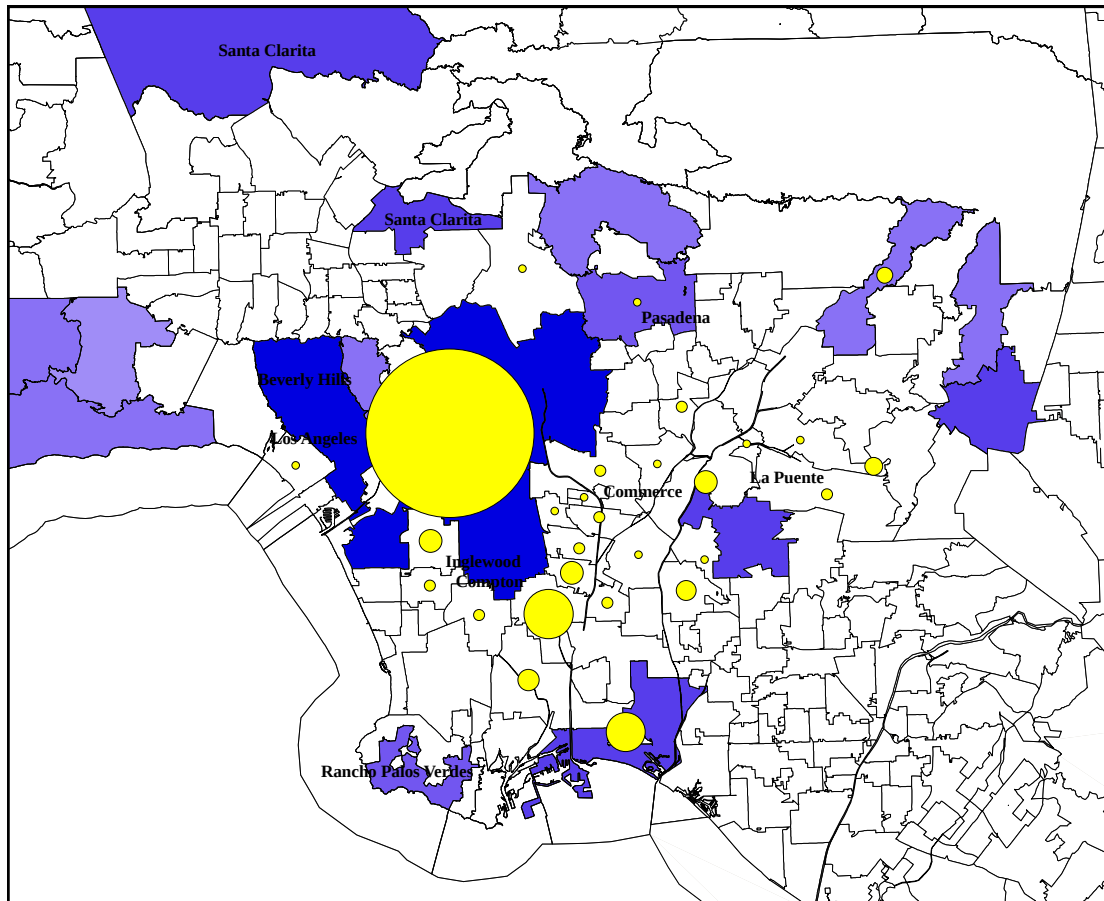


Image 69: Gang Homicide and Population Data by City for Los Angeles County in 2003

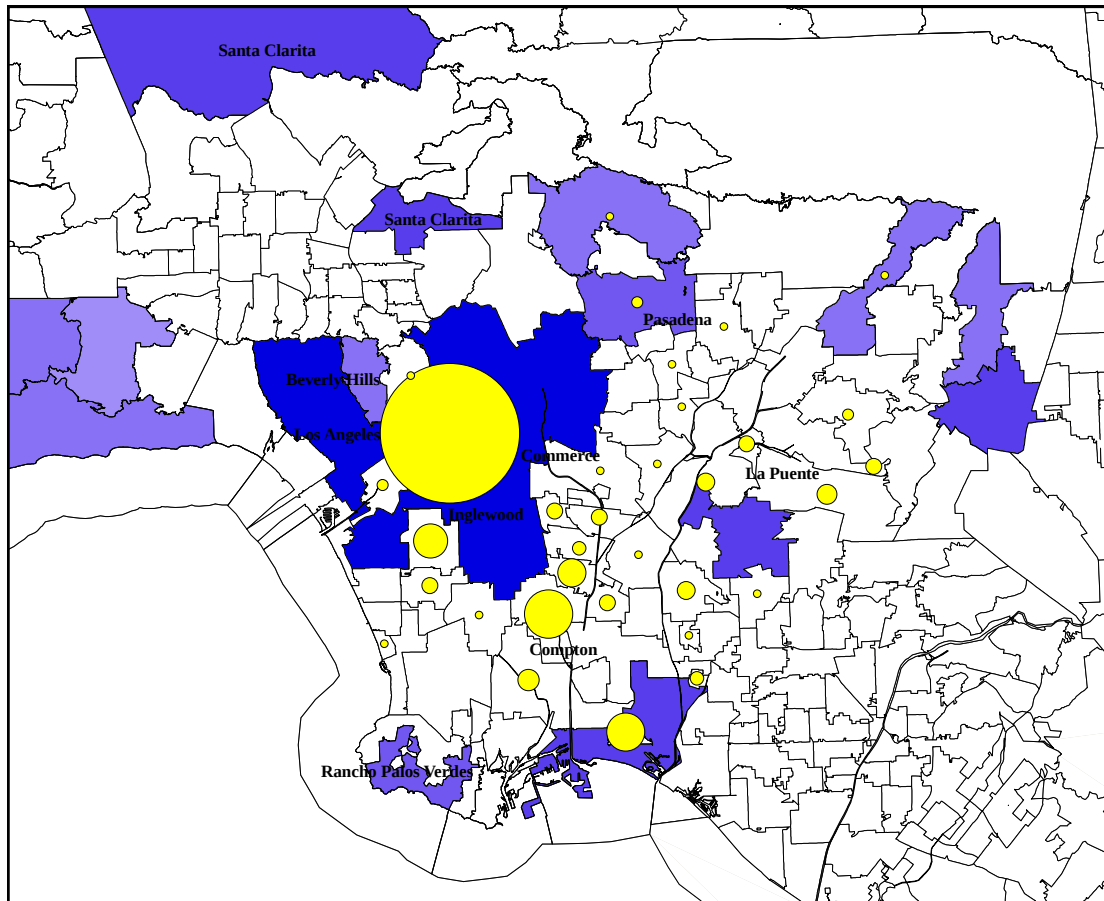


Image 70: Gang Homicide and Population Data by City for Los Angeles County in 2004

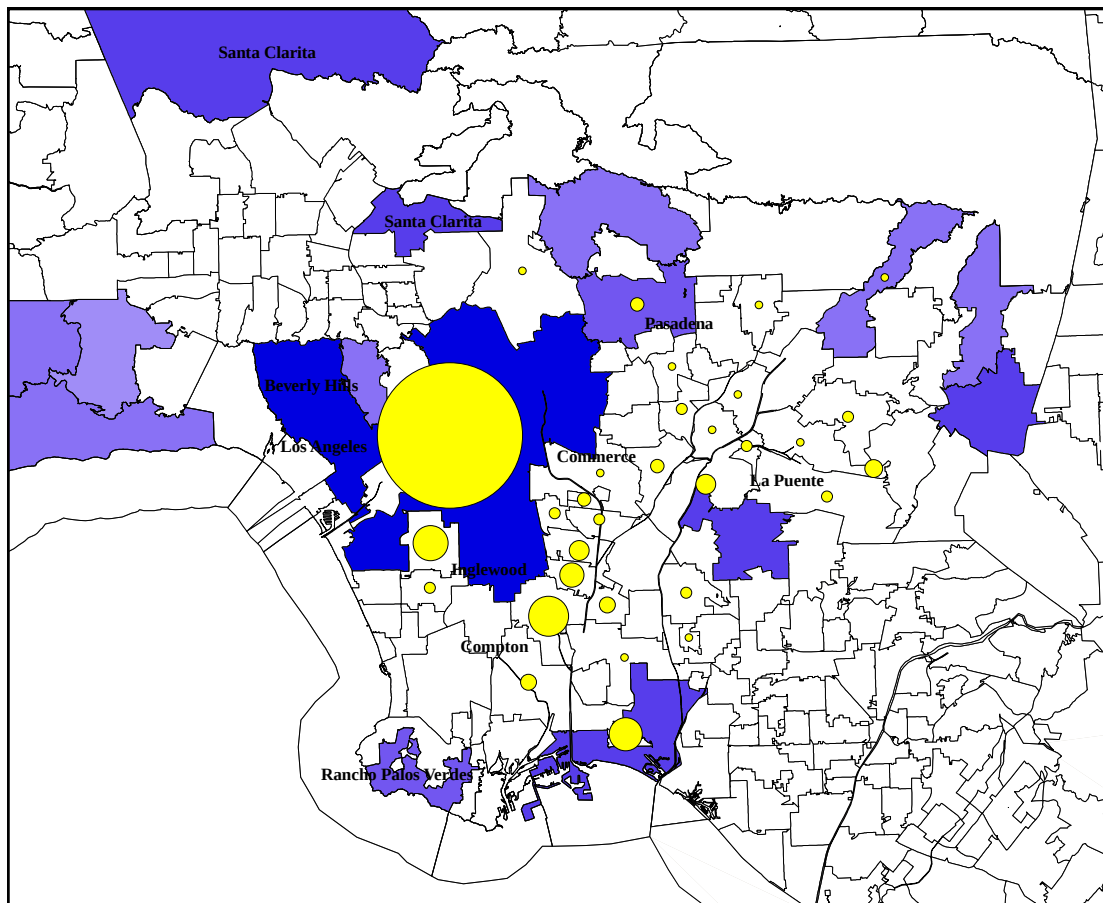


Image 71: Gang Homicide and Population Data by City for Los Angeles County in 2005

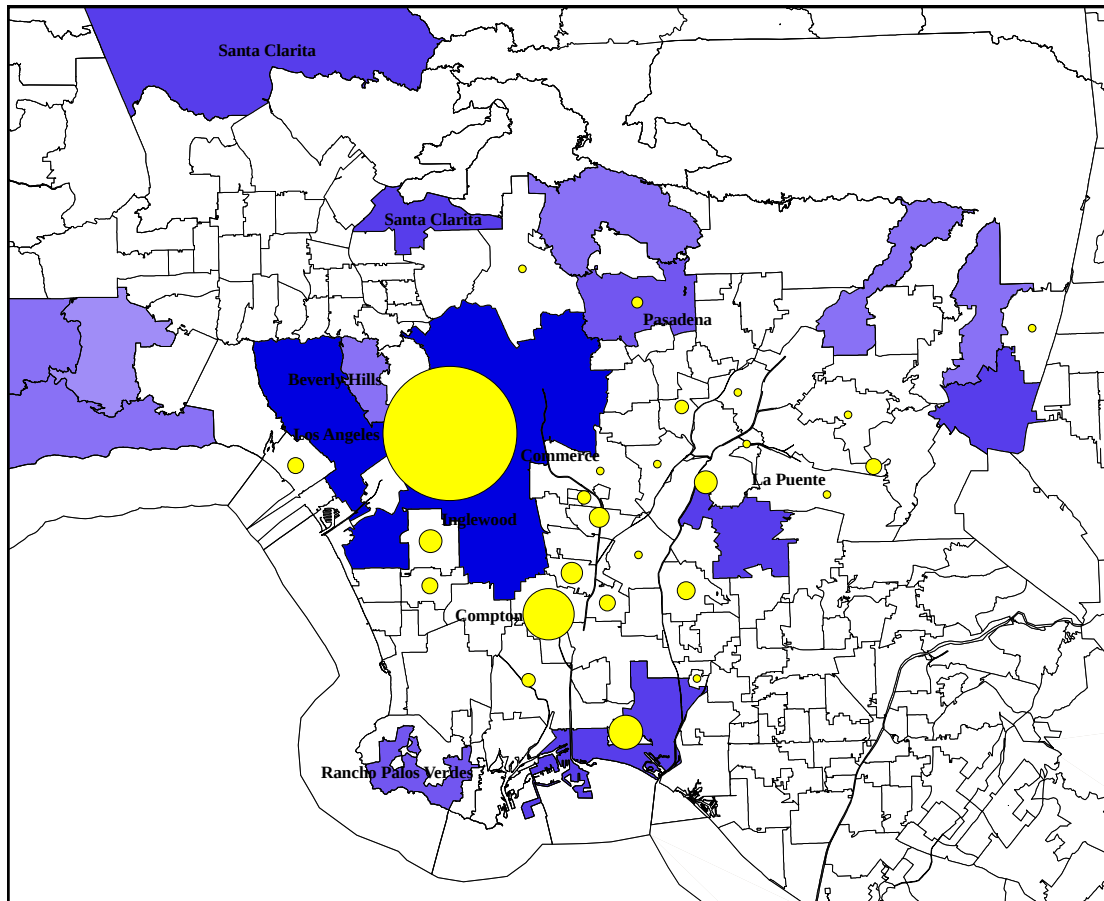


Image 72: Gang Homicide and Population Data by City for Los Angeles County in 2006

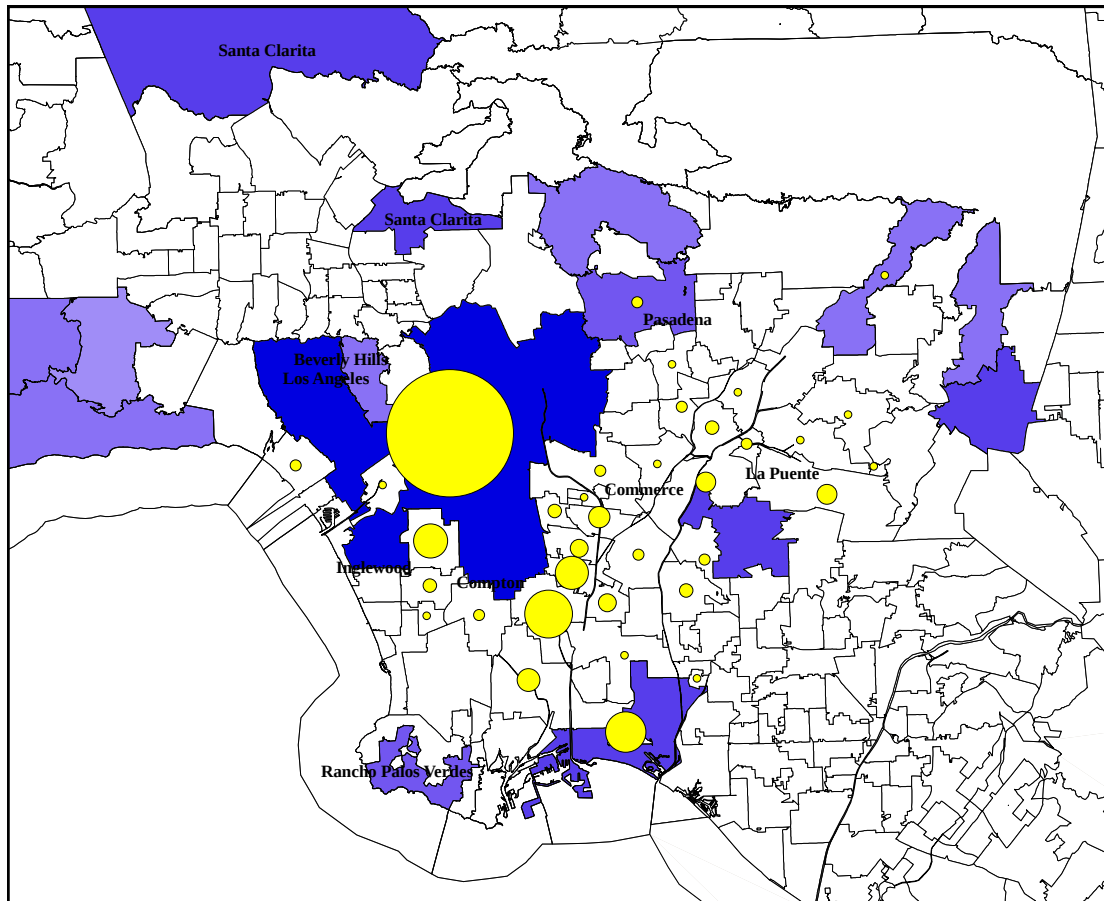
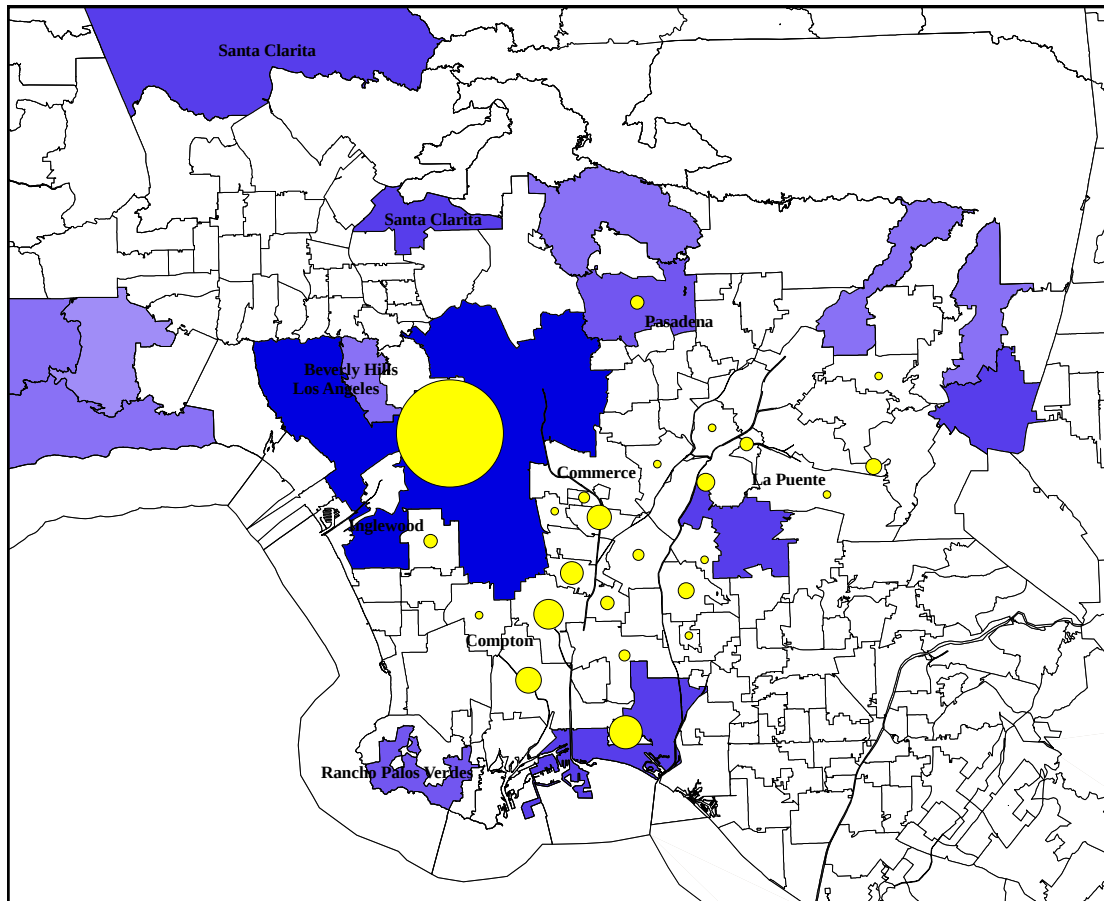
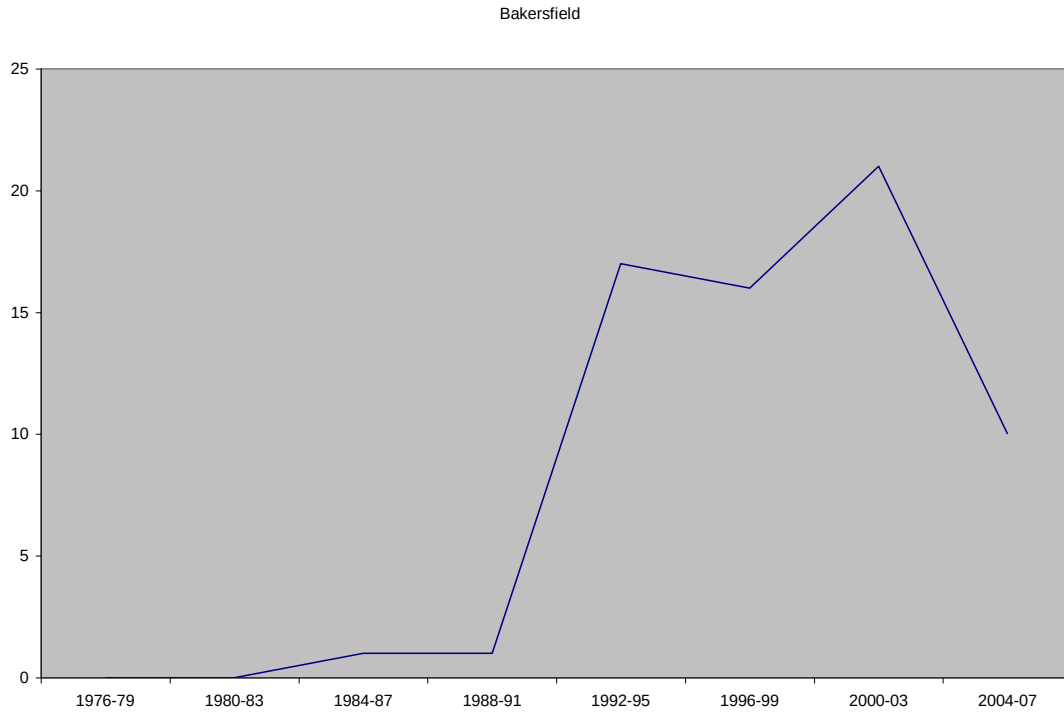


Image 73: Gang Homicide and Population Data by City for Los Angeles County in 2007

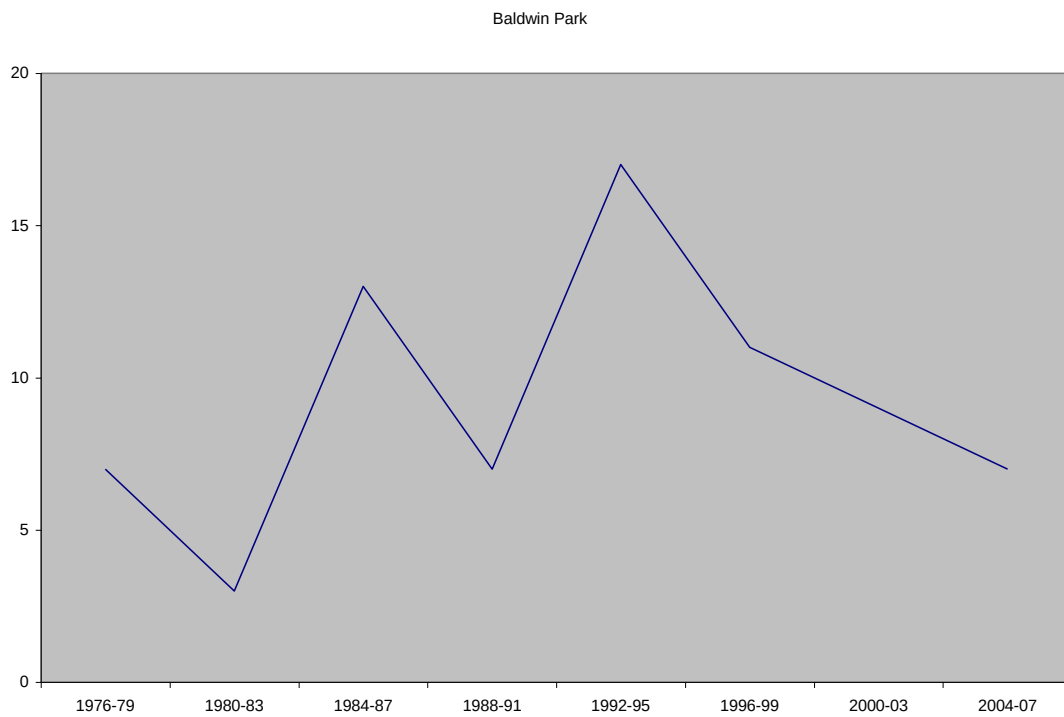


Appendix 4: Temporal Analysis Graphs for California Cities Meeting Qualification Criteria

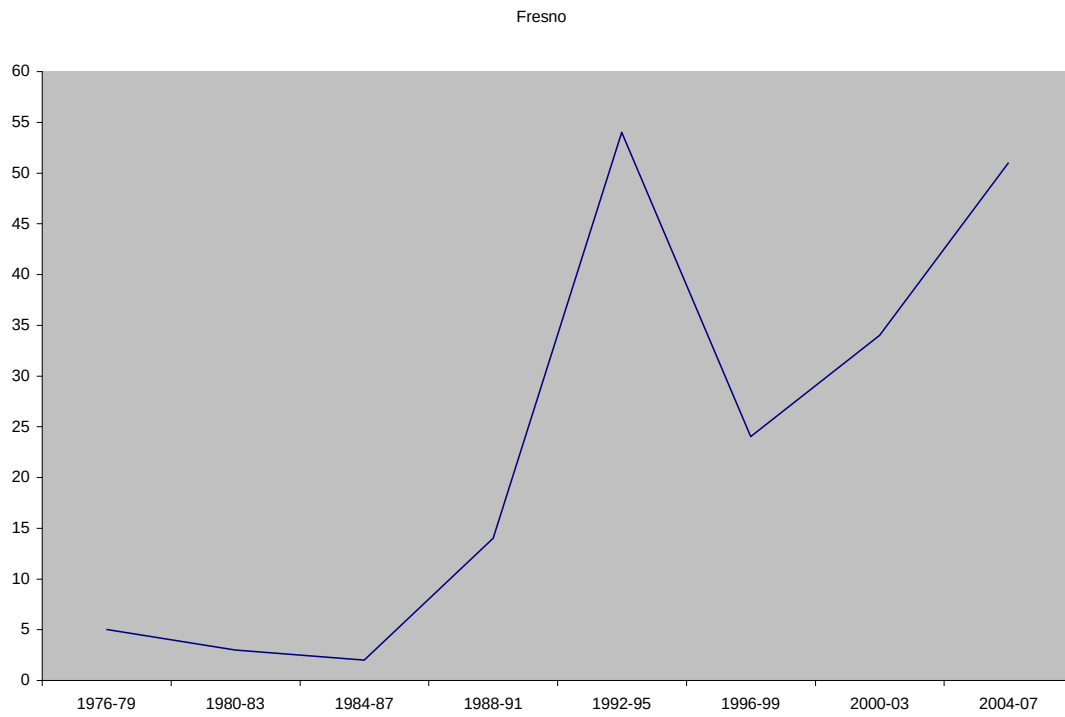
Graph 13: Gang Homicide Distribution for Bakersfield, California



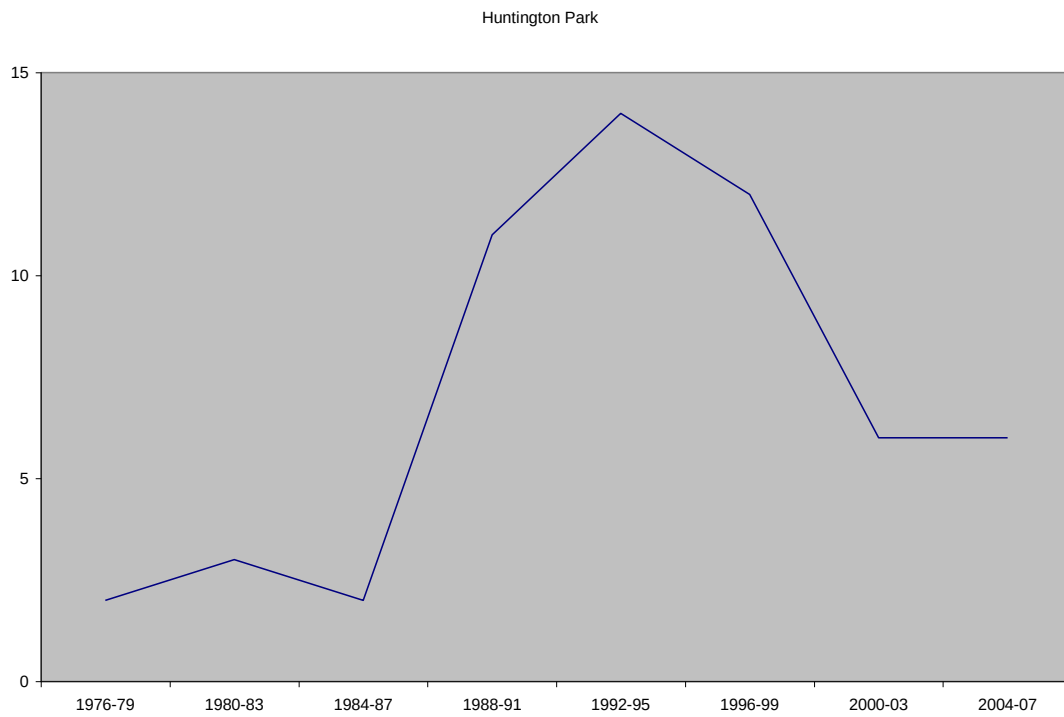
Graph 14: Gang Homicide Distribution for Baldwin Park, California



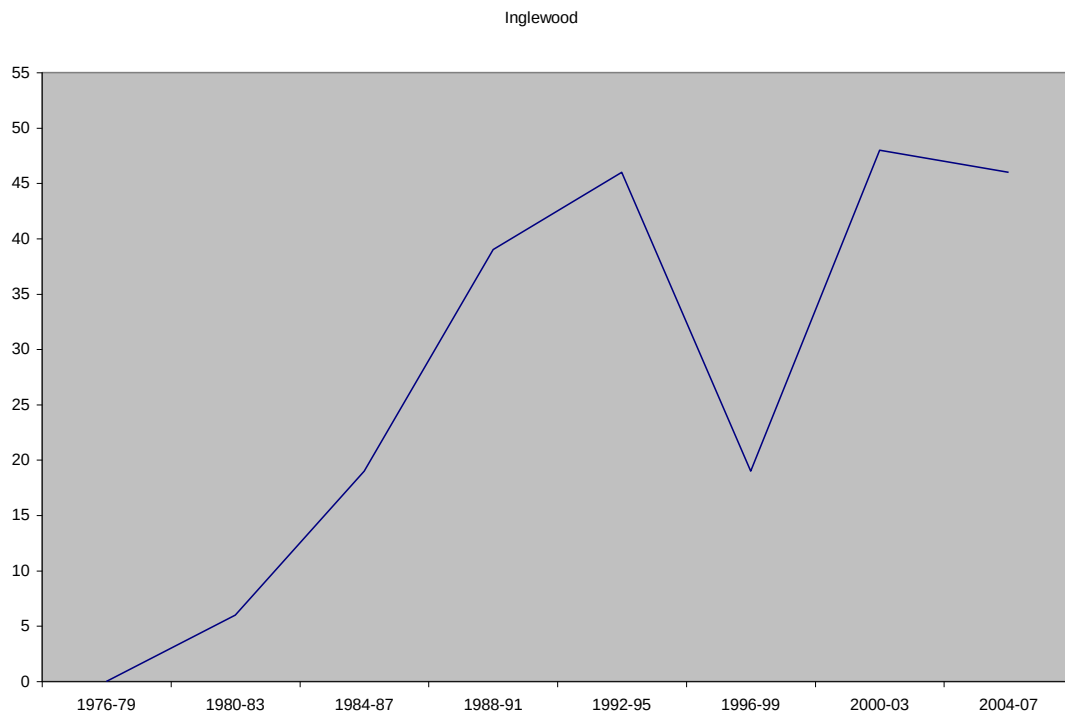
Graph 15: Gang Homicide Distribution for Fresno, California



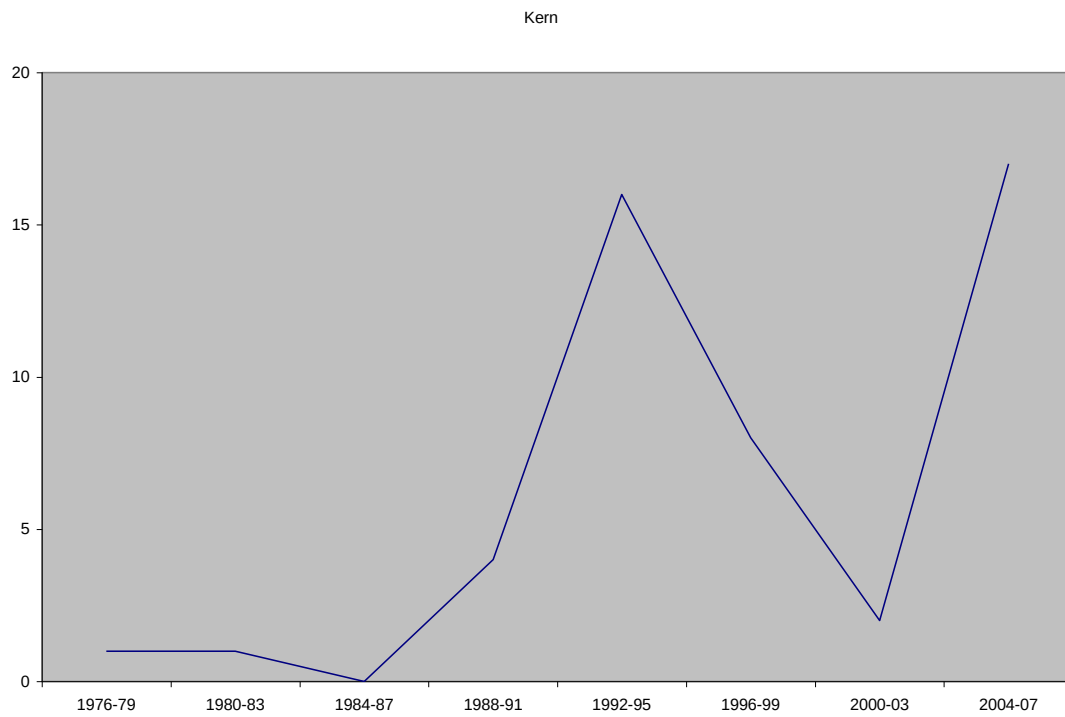
Graph 16: Gang Homicide Distribution for Huntington Park, California



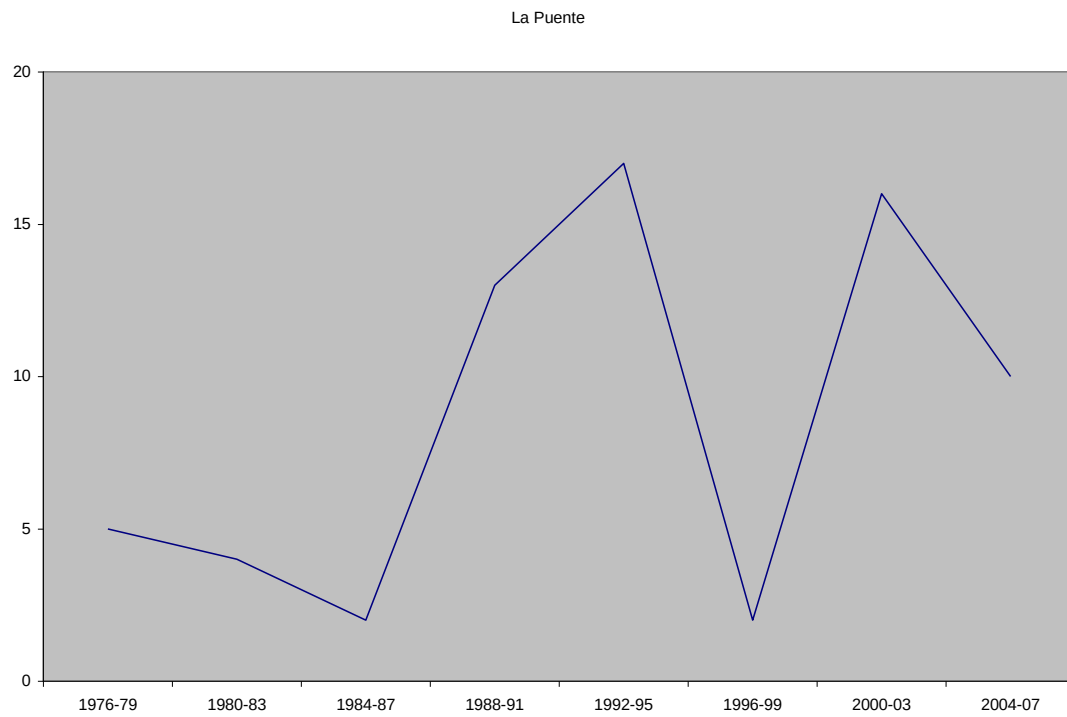
Graph 17: Gang Homicide Distribution for Inglewood, California



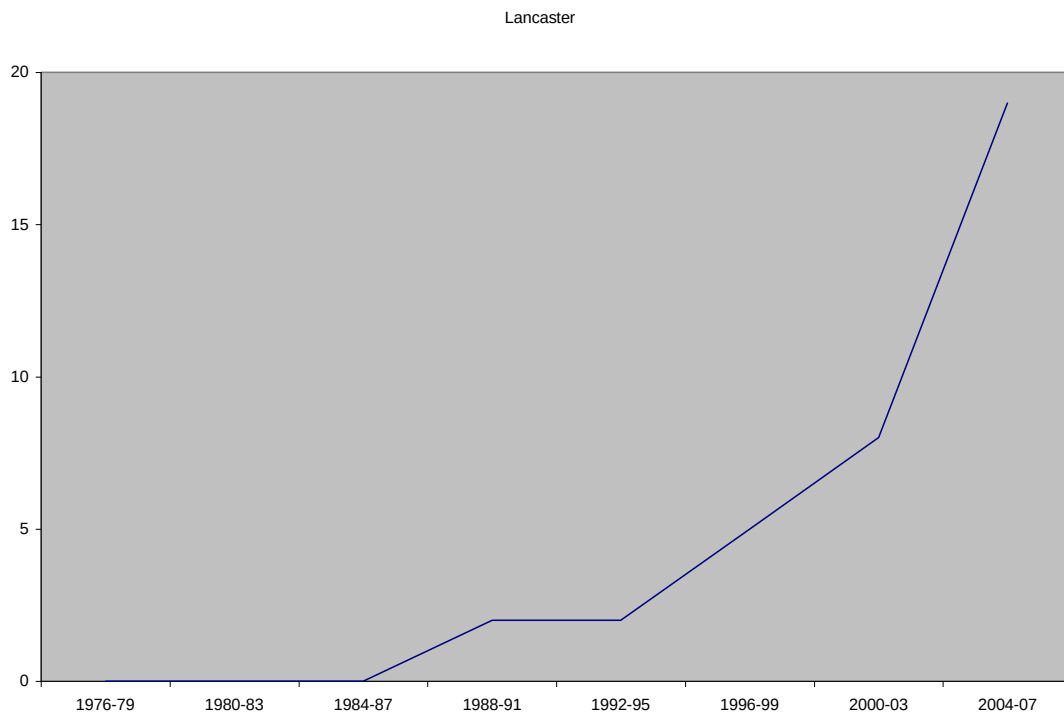
Graph 18: Gang Homicide Distribution for Kern, California



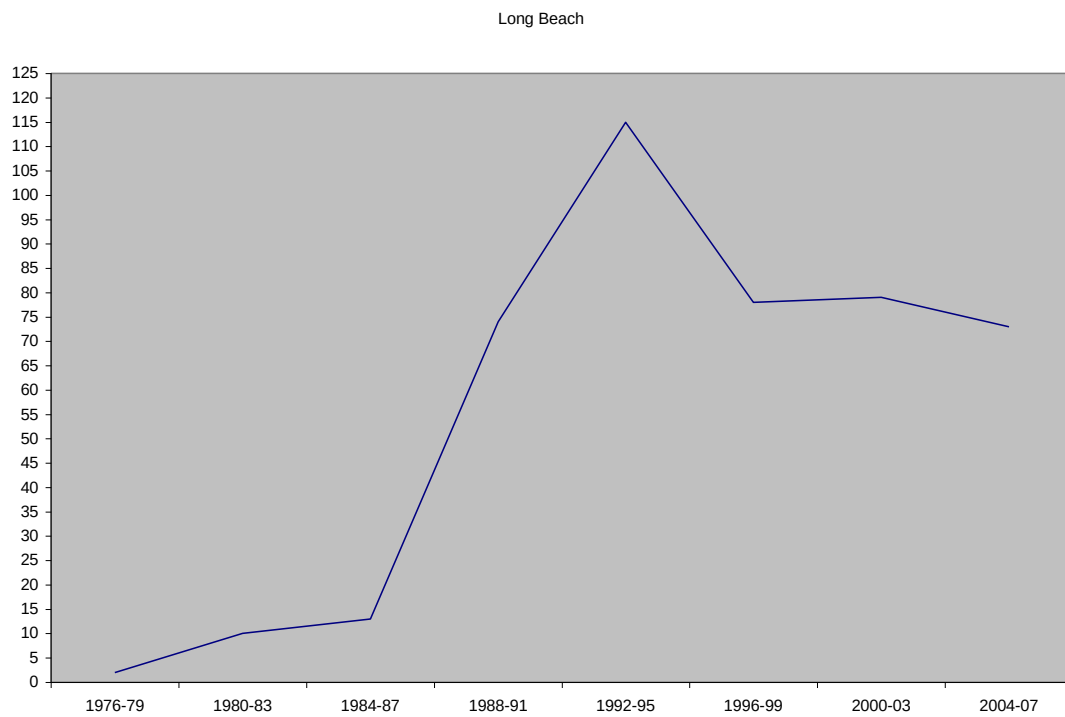
Graph 19: Gang Homicide Distribution for La Puente, California



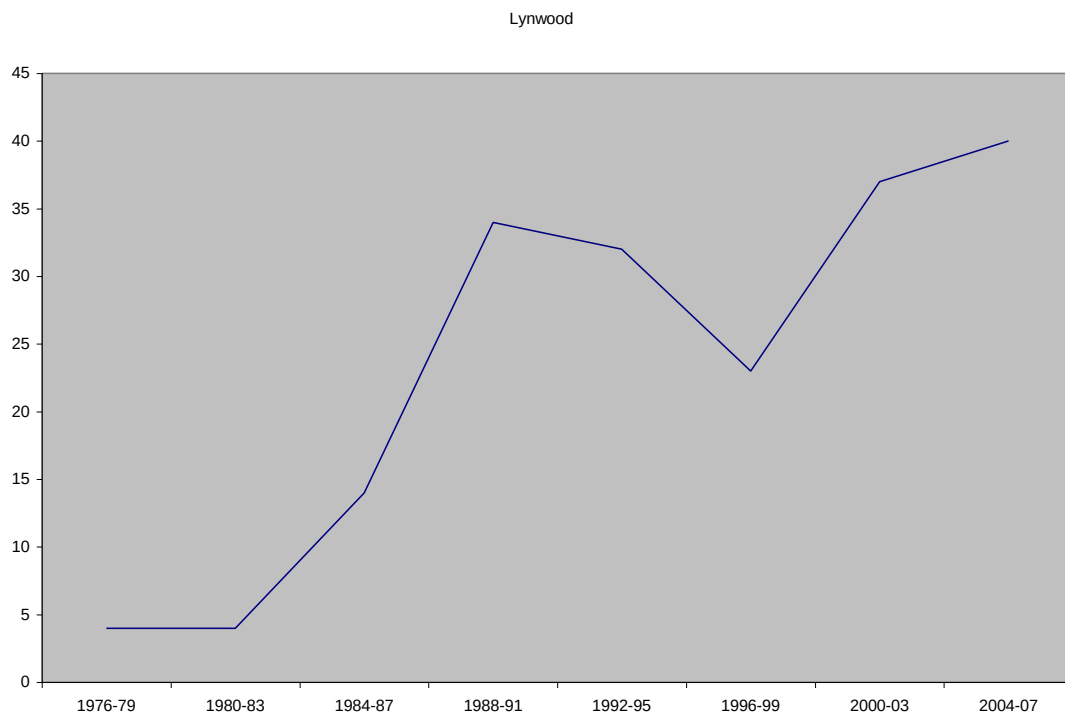
Graph 20: Gang Homicide Distribution for Lancaster, California



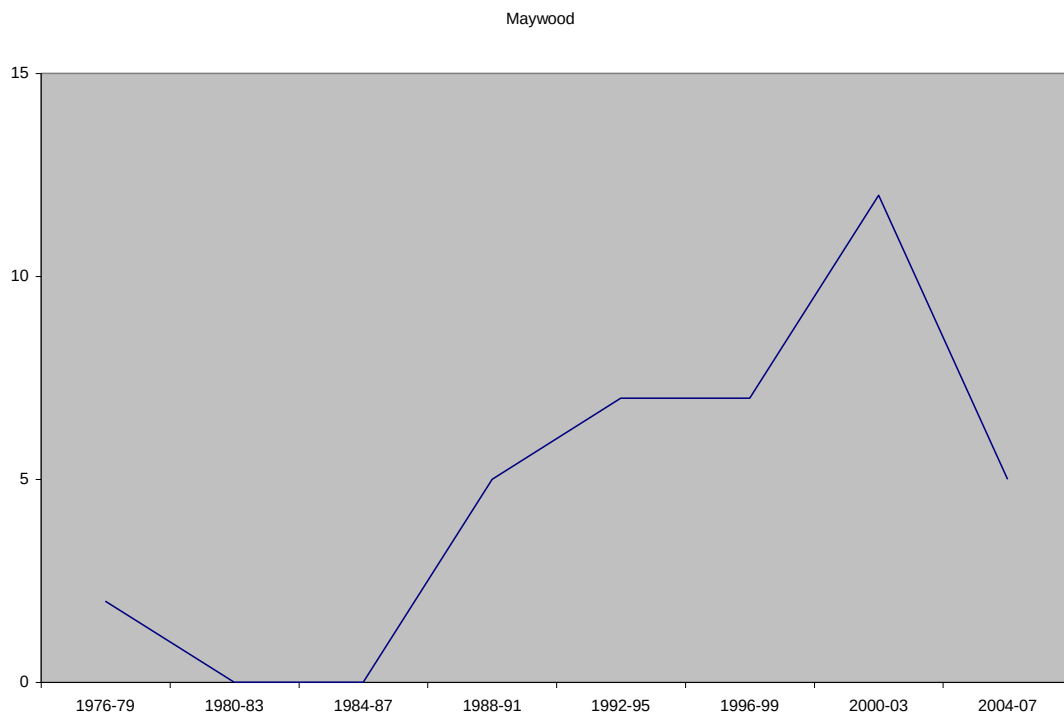
Graph 21: Gang Homicide Distribution for Long Beach, California



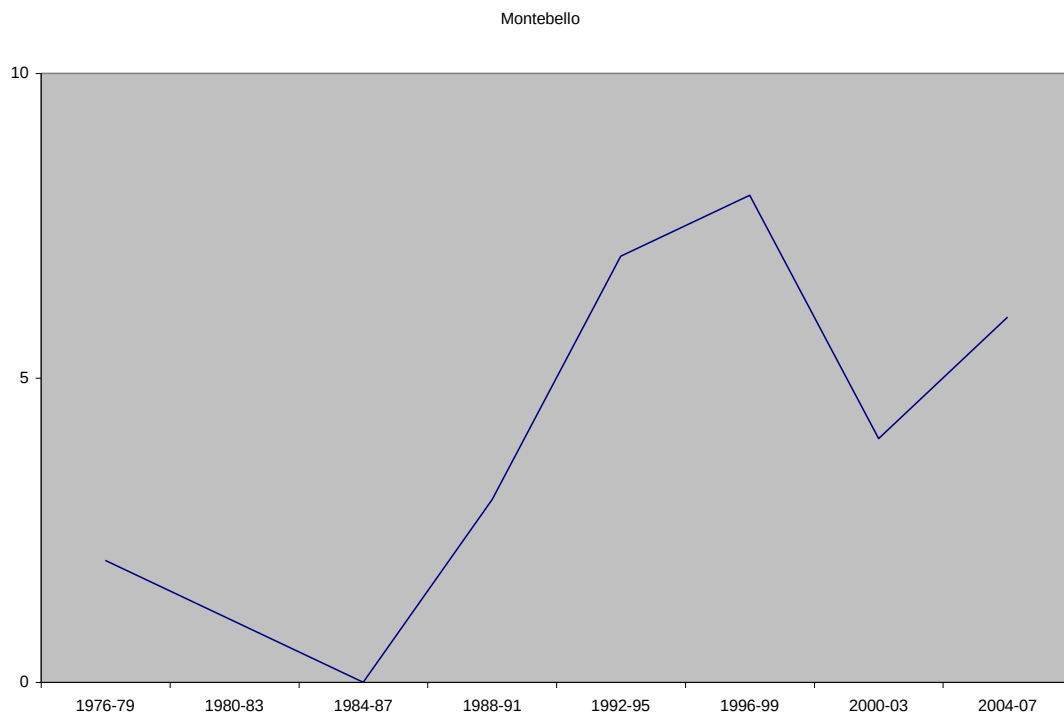
Graph 22: Gang Homicide Distribution for Lynwood, California



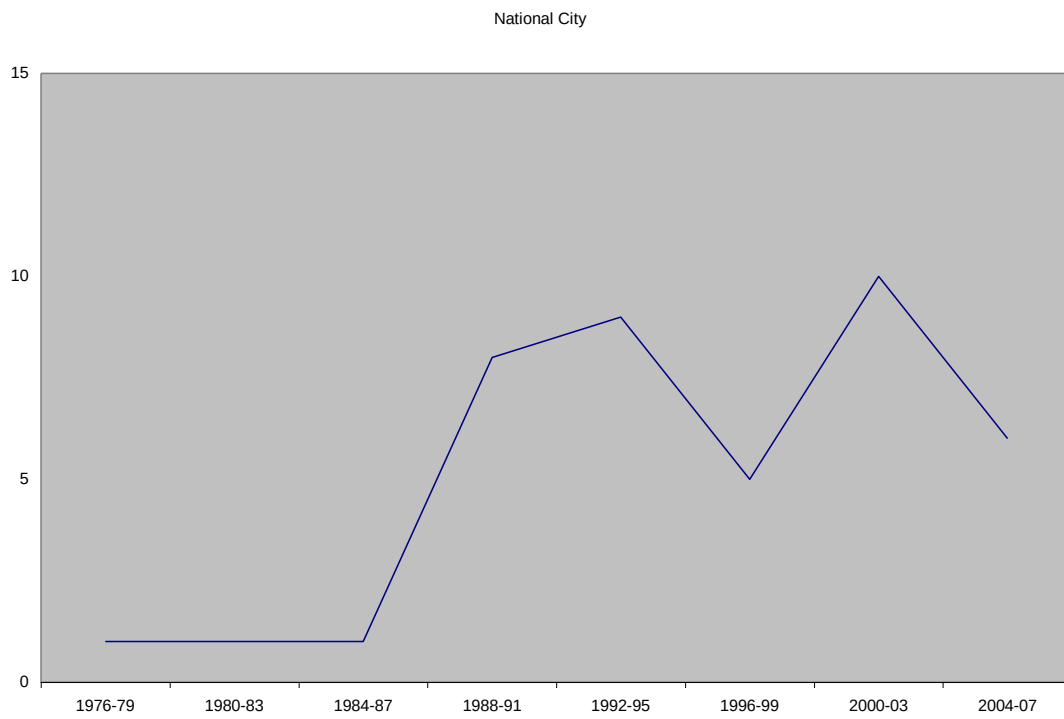
Graph 23: Gang Homicide Distribution for Maywood, California



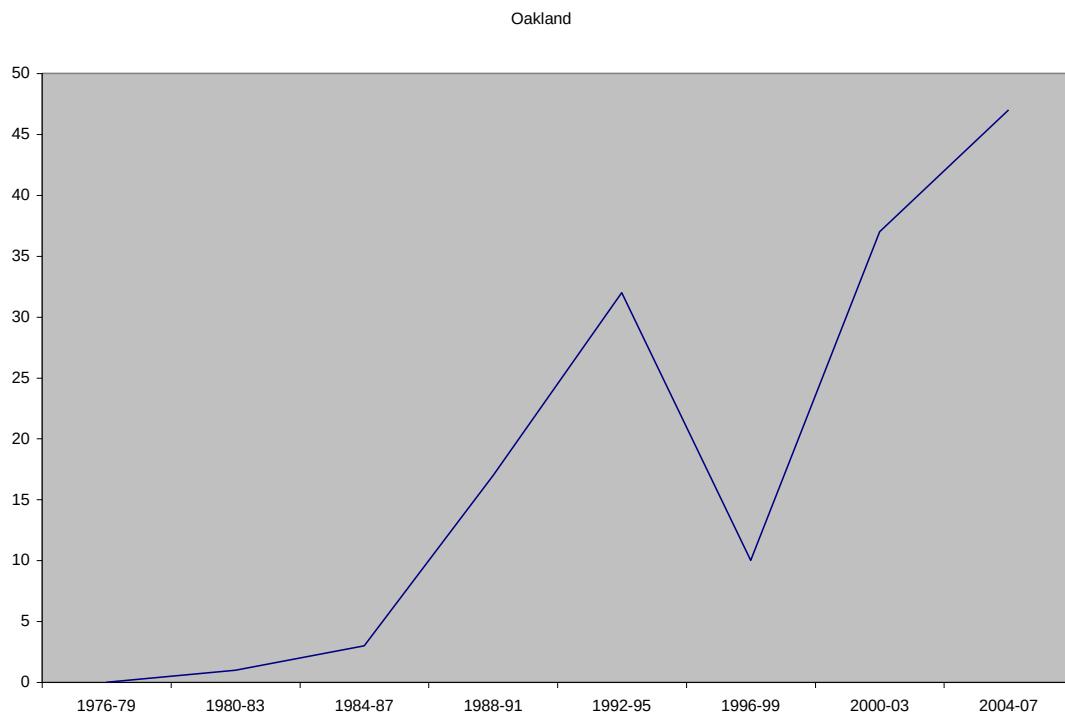
Graph 24: Gang Homicide Distribution for Montebello, California



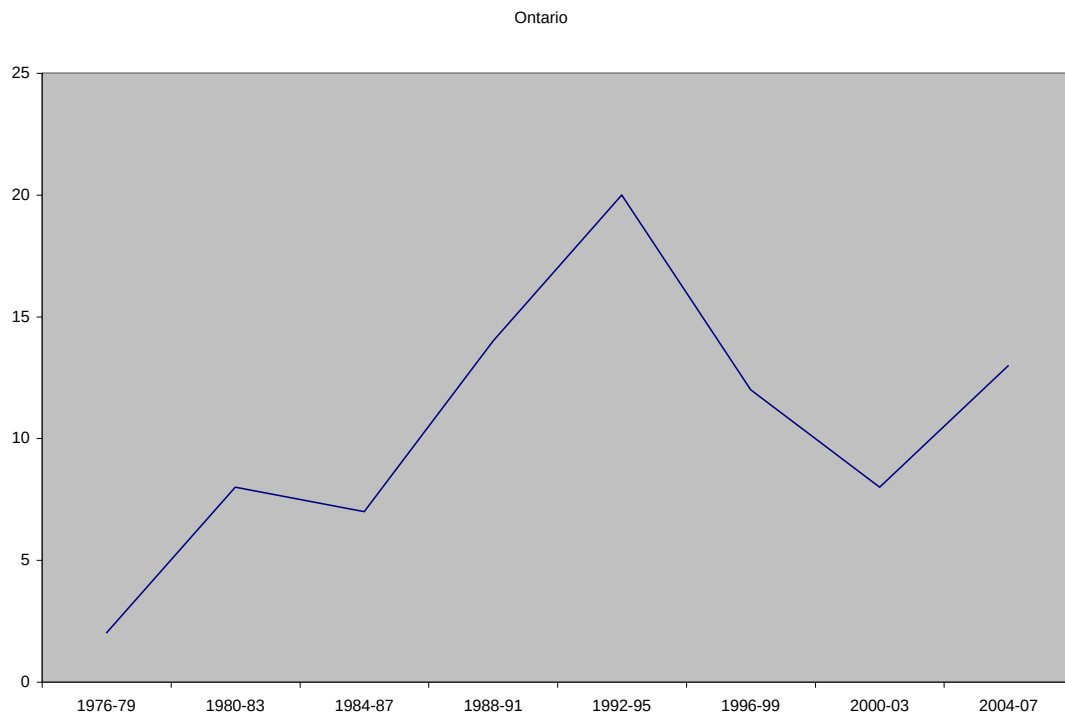
Graph 25: Gang Homicide Distribution for National City, California



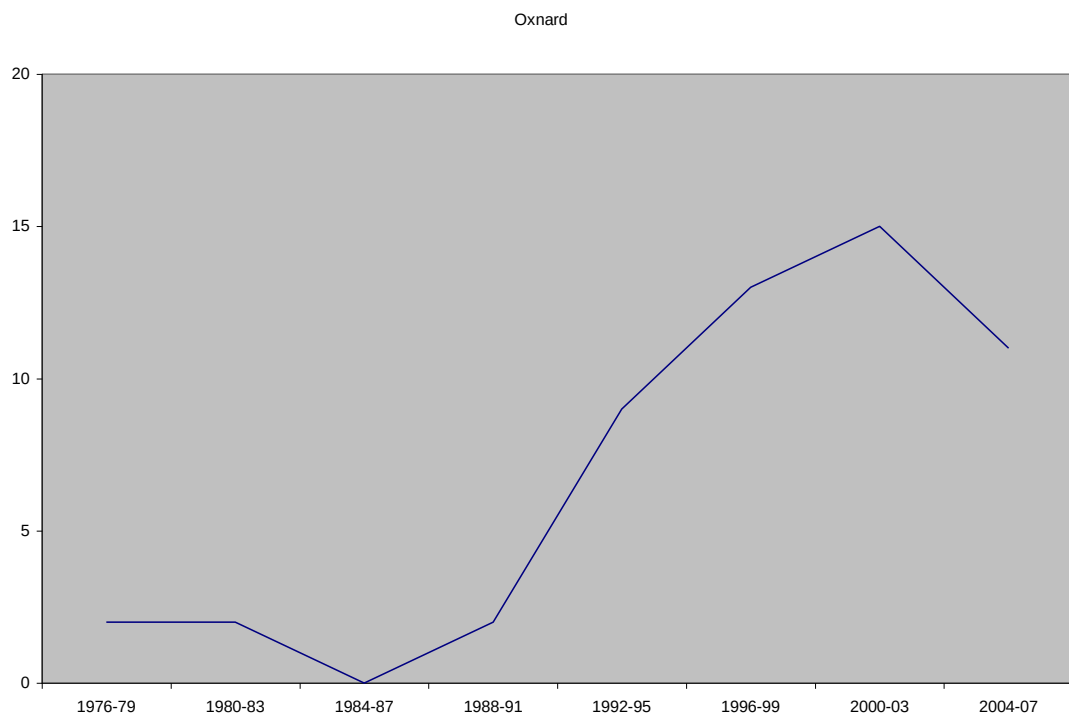
Graph 26: Gang Homicide Distribution for Oakland, California



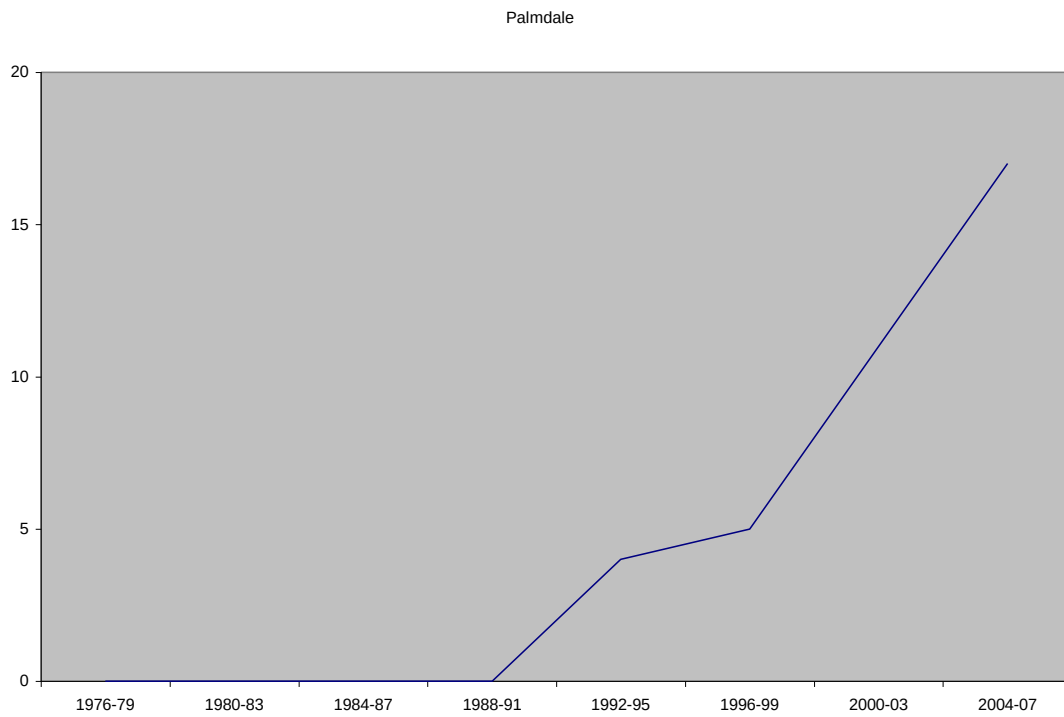
Graph 27: Gang Homicide Distribution for Ontario, California



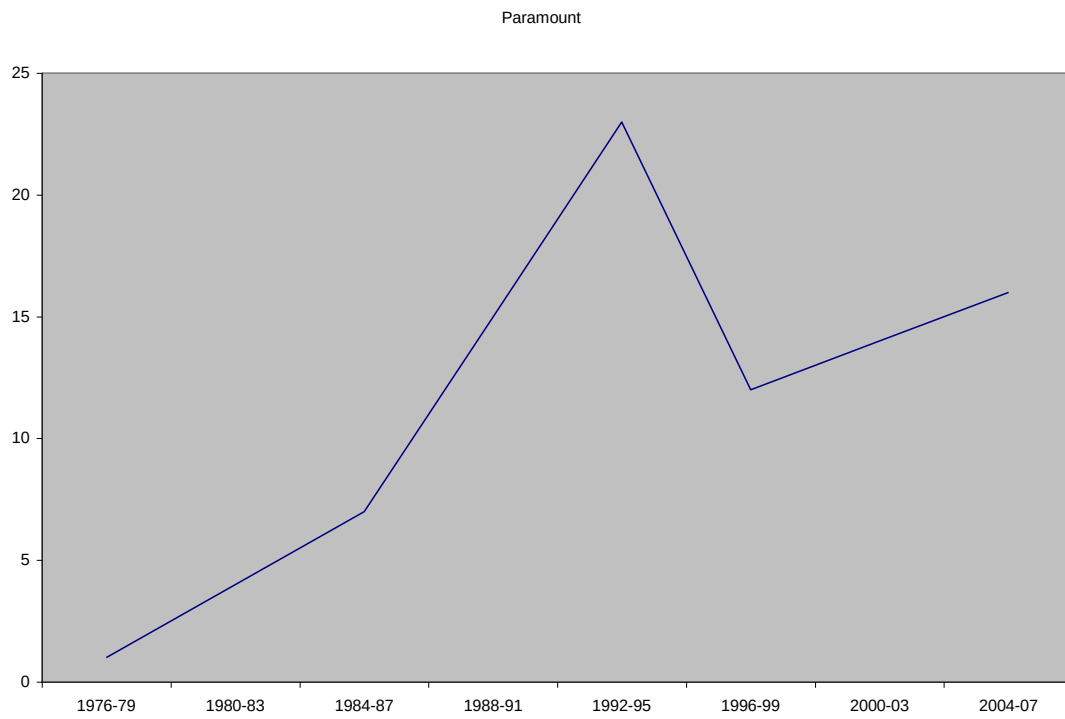
Graph 28: Gang Homicide Distribution for Oxnard, California



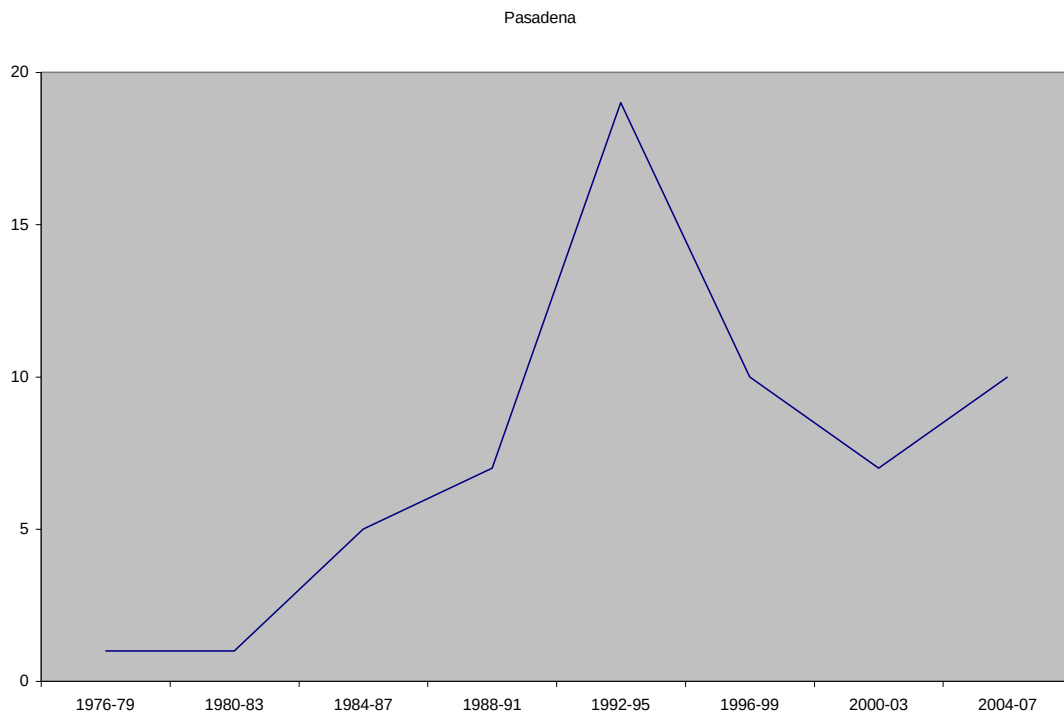
Graph 29: Gang Homicide Distribution for Palmdale, California



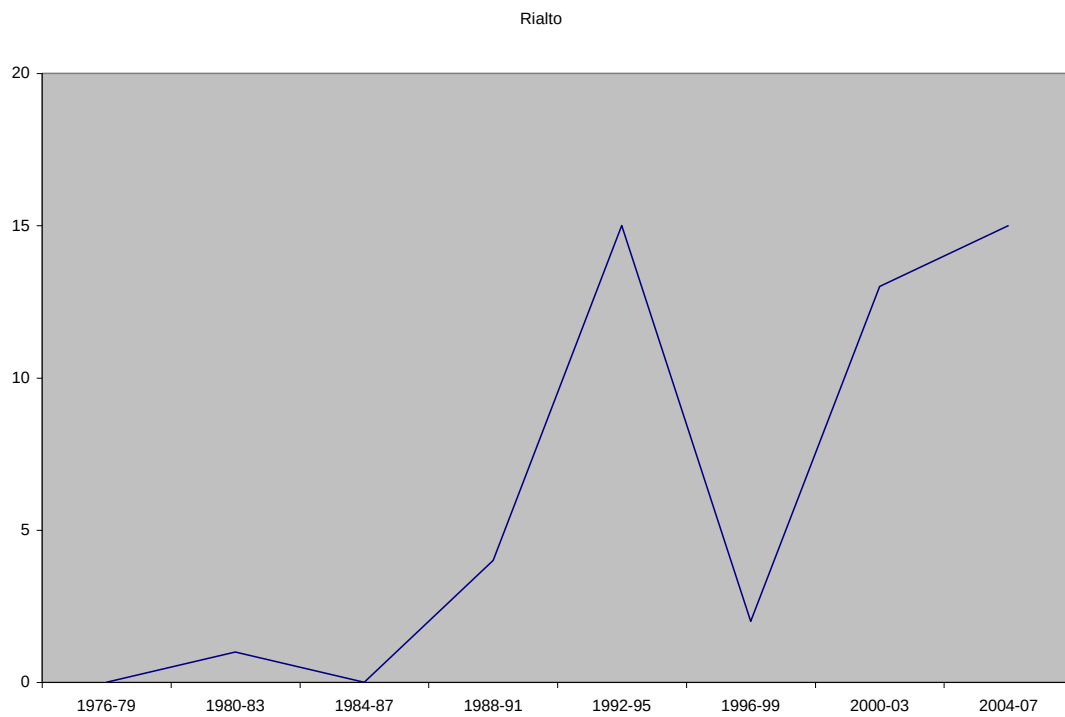
Graph 30: Gang Homicide Distribution for Paramount, California



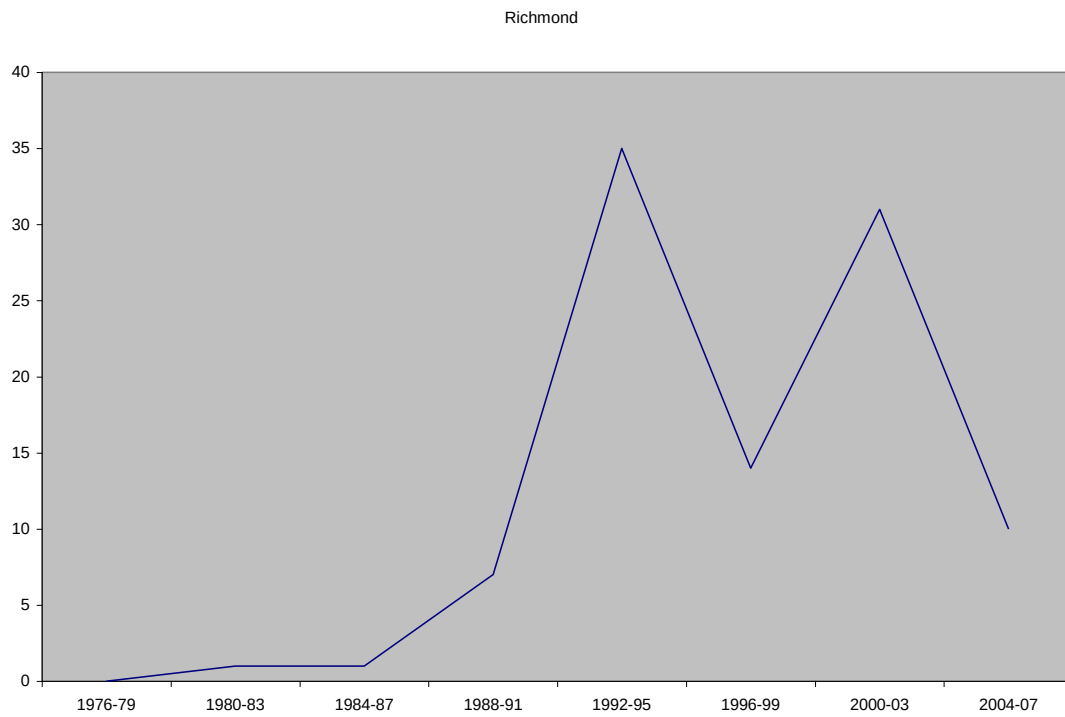
Graph 31: Gang Homicide Distribution for Pasadena, California



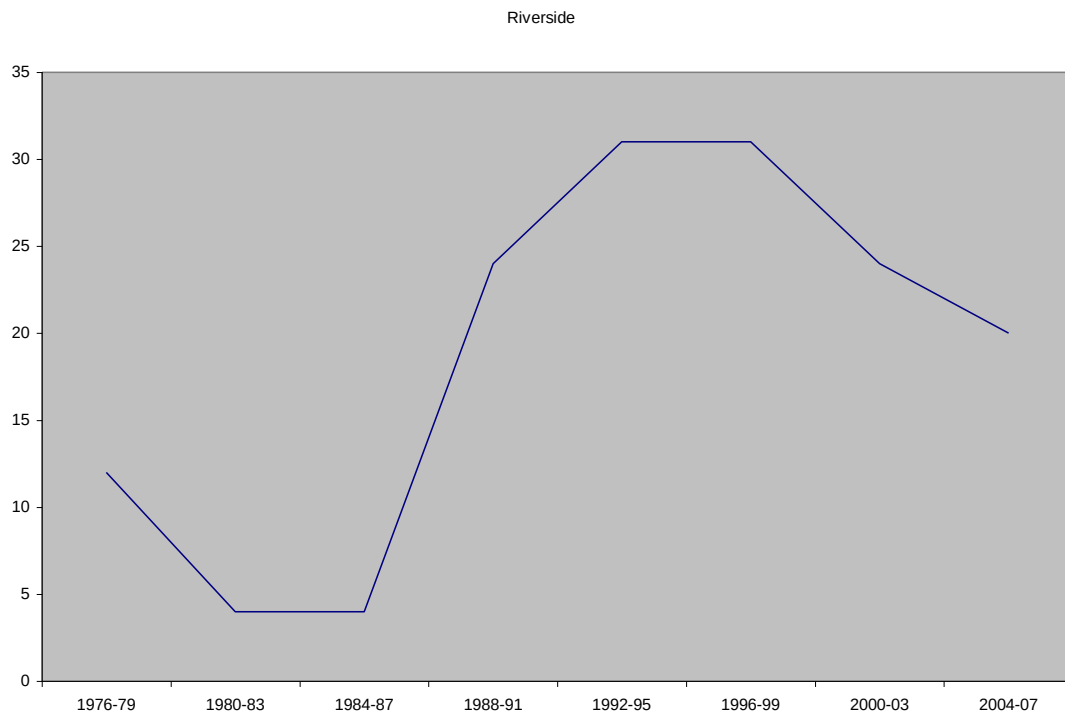
Graph 32: Gang Homicide Distribution for Rialto, California



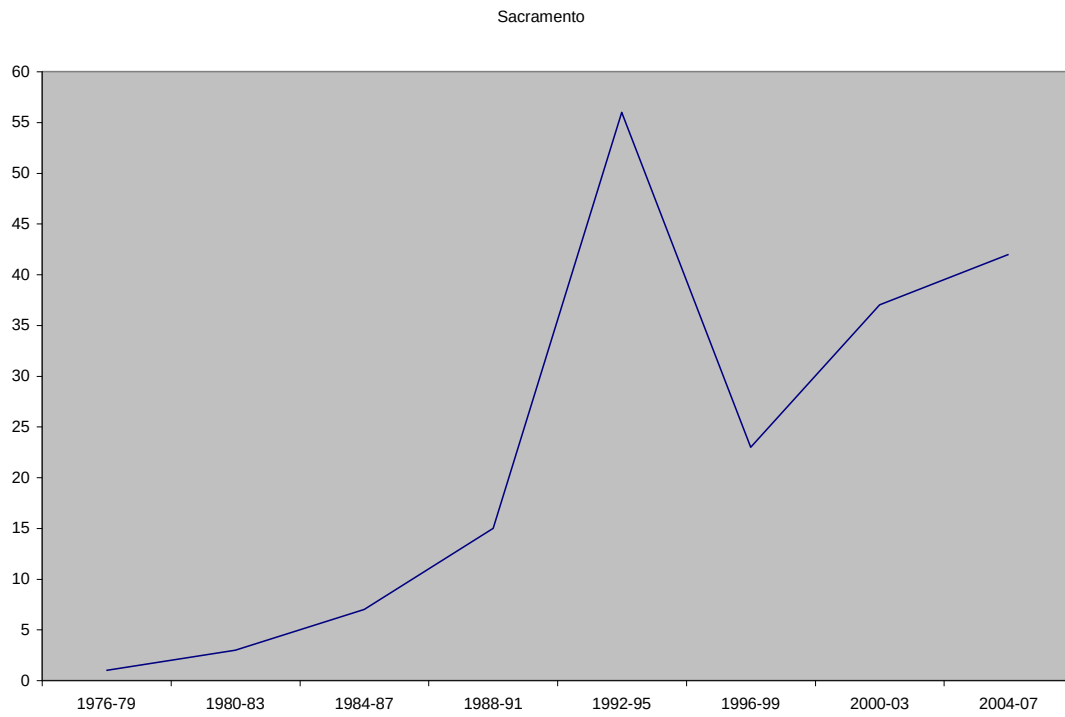
Graph 33: Gang Homicide Distribution for Richmond, California



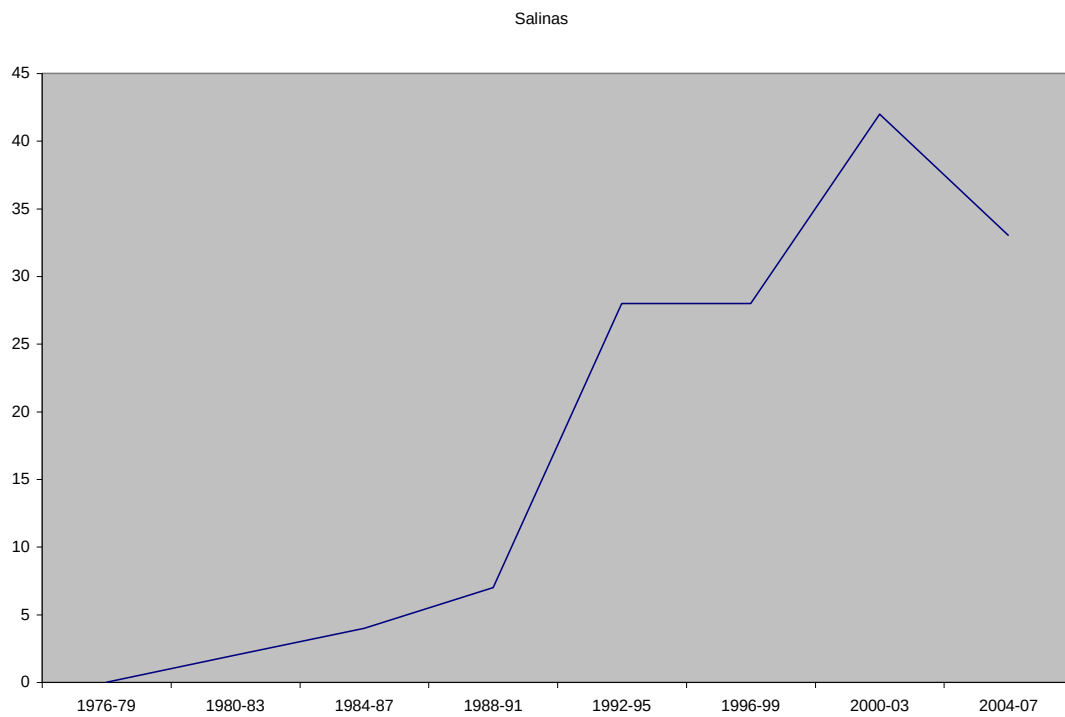
Graph 34: Gang Homicide Distribution for Riverside, California



Graph 35: Gang Homicide Distribution for Sacramento, California



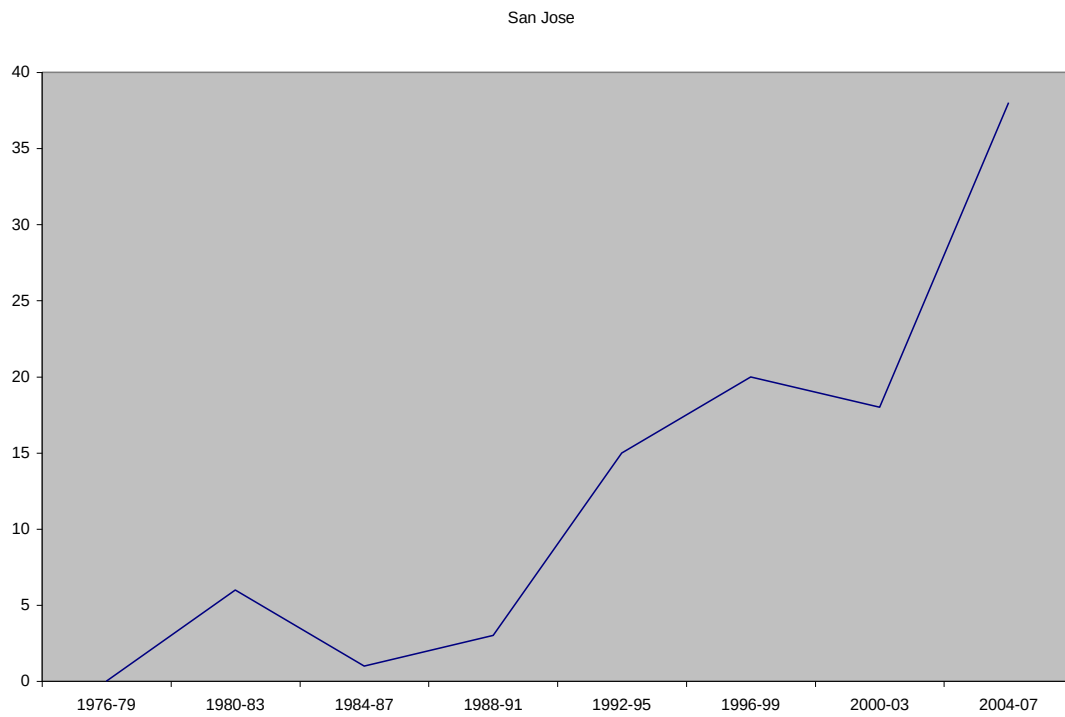
Graph 36: Gang Homicide Distribution for Salinas, California



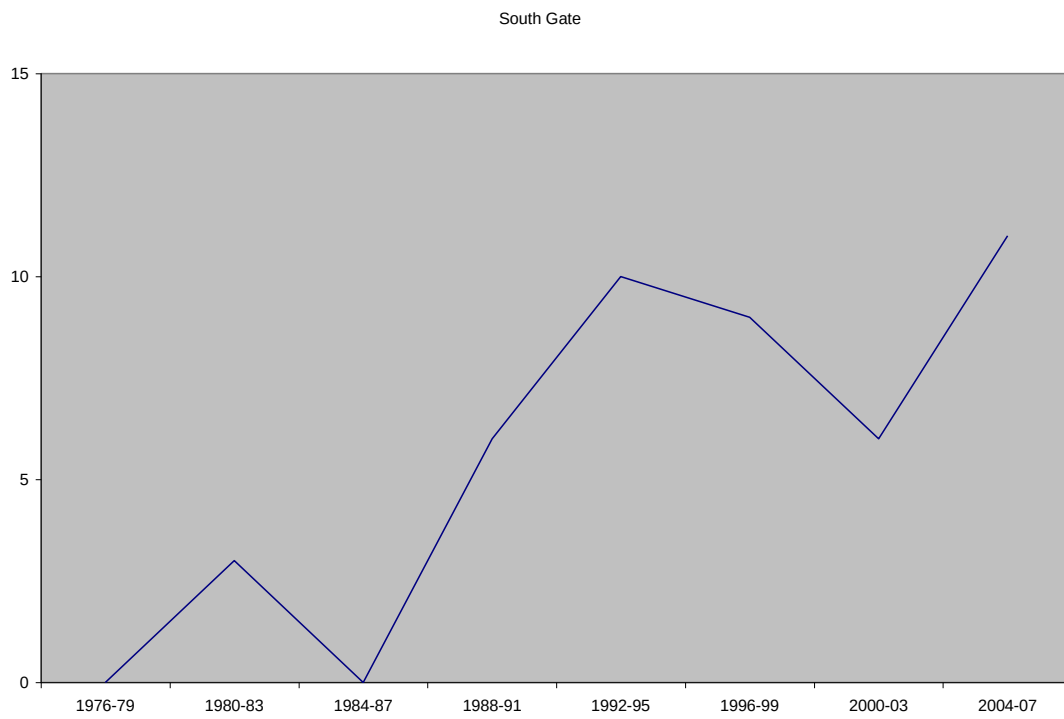
Graph 37: Gang Homicide Distribution for San Diego, California



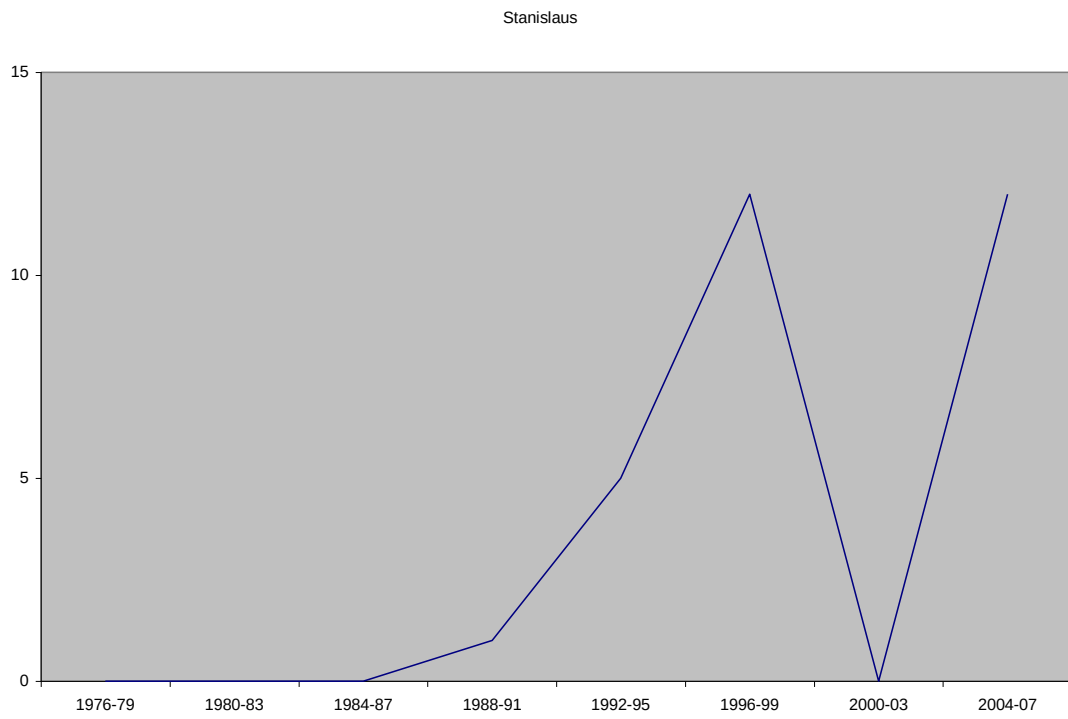
Graph 38: Gang Homicide Distribution for San Jose, California



Graph 39: Gang Homicide Distribution for South Gate, California



Graph 40: Gang Homicide Distribution for Stanislaus, California



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