

Alarming Increase in Driving Fatalities in the Inland Empire



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Introduction

Traffic fatalities in California's Inland Empire represent a critical public health challenge, with alcohol-impaired driving emerging as a key contributor to the region's safety crisis. Analysis of crash data from 2013-2022 reveals:

- Alcohol-Impaired Driving Fatalities:** The Inland Empire's alcohol-related fatality rate of 0.549 per 100 million Vehicle Miles Traveled (VMT) exceeds California's average of 0.39—a 40% higher rate.
- Overall Fatality Trends:** Traffic fatalities surged from 489 in 2013 to 800 in 2022, a 39.5% increase. The FVMT rate per 100 million VMT in the Inland Empire at 1.70, 43% higher than LA County.
- Unique Geographical Dynamics:** The region's blend of urban centers and rural road networks creates a complex safety environment, with high-speed rural-like roadways near urban areas amplifying crash severity.
- Pandemic Impact:** Despite reduced traffic during COVID-19 (2020-2022), the region saw increased fatalities due to higher speeds, reduced enforcement, and heightened driver stress.
- Spatial Distribution:** Major cities like San Bernardino (434 fatalities) and Riverside (363 fatalities) serve as epicenters, while smaller cities and rural areas face significant risks.
- Critical Environmental Factors:** Analysis shows correlation (Cramer's $V = 0.2628$) between lighting and alcohol-impaired fatalities, with 39.7% in "Dark - Street Lights" and 18.4% in "Dark - No Street Lights," contrasting with regular fatal crashes.

Methodology

Our analysis integrated multiple data sources to examine traffic fatalities in the Inland Empire:

- Data Sources:**
 - SWITRS (Statewide Integrated Traffic Records System)
 - HPMS (Highway Performance Monitoring System)
 - NHTSA-FARS (Fatality Analysis Reporting System)
 - Google Geocoding API for spatial data validation
- Statistical Methods:**
 - Cramer's V: Analyzed relationships between alcohol involvement and environmental factors
 - Point-Biserial Correlation: Examined fatality counts and alcohol involvement
 - Mann-Whitney U Test: Compared alcohol vs. non-alcohol crash distributions
 - Chi-Square Test: Assessed categorical variable relationships
- Study Scope:**
 - Time Period: 2013-2022, with focus on COVID-19 period (2020-2022)
 - Region: Inland Empire (San Bernardino and Riverside Counties)
- Data Processing:** Standardized using TrafficDataCleaner protocol

Results

- Vehicle Miles Traveled (VMT) and Fatality Metrics:**
 - Fatal Vehicle Miles Traveled (FVMT) Rate: 1.70 per 100 million VMT
 - 43% higher than LA County's rate
 - Significantly exceeds California state average
 - Alcohol-Impaired Driving Fatality Rate: 0.549 per 100 million VMT
 - 40% higher than California's statewide average of 0.39
 - Total annual VMT in the Inland Empire: Approximately 28.6 billion miles

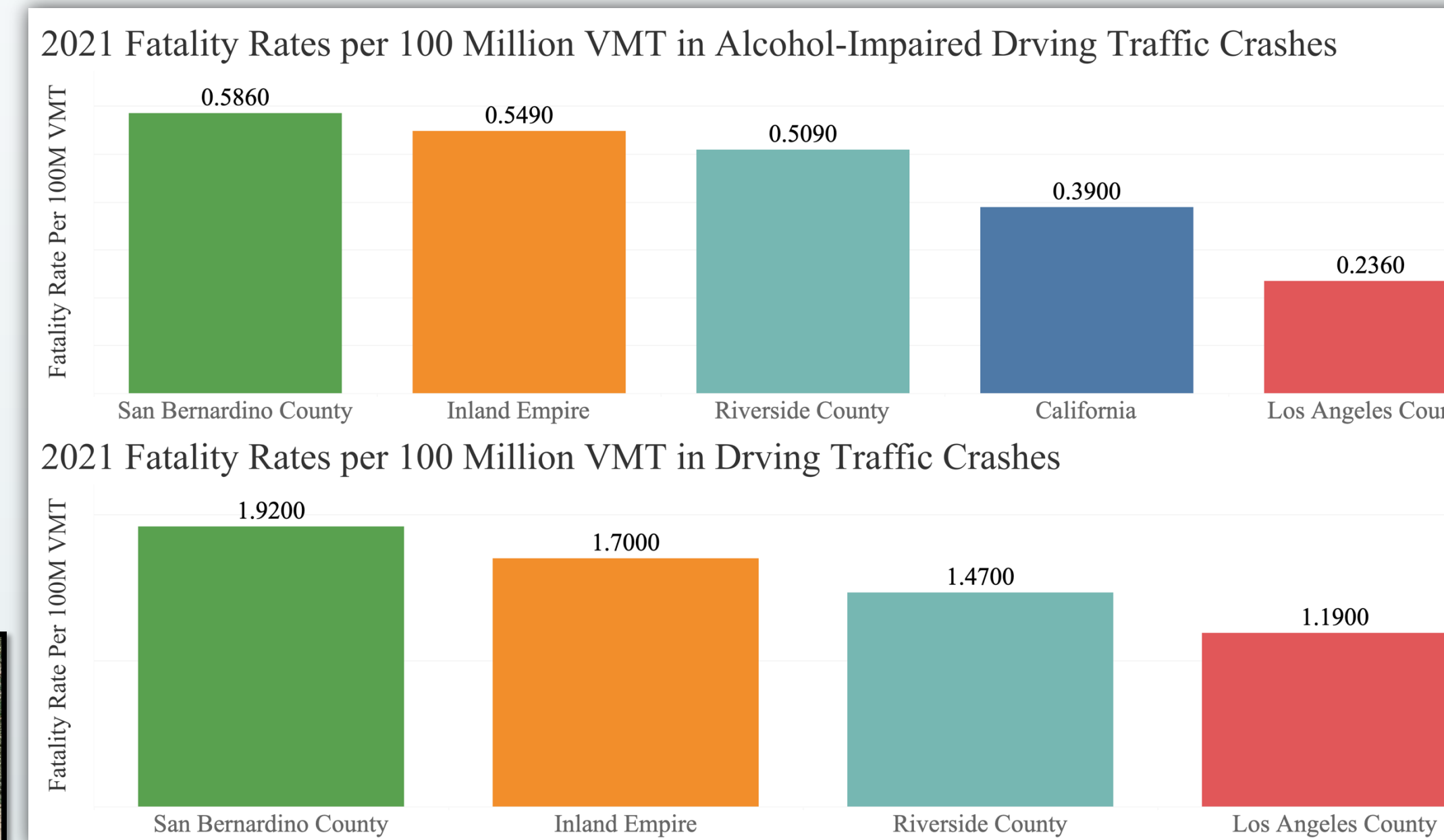


Figure 5. Comparison of Regional Fatality Rates per 100 Million VMT for Alcohol-Impaired and Total Traffic Crashes, 2021

- Key Temporal and Spatial Patterns:**
 - Overall fatalities increased 39.5% (2013-2023)
 - Peak hours 18:00-24:00, with highest concentration 19:00-20:00 (419 deaths)
- Urban-Rural Dynamics:**
 - Major Centers: San Bernardino (434 fatalities), Riverside (363 fatalities)
 - Rural Risk: 42% higher fatal crash rates despite lower traffic volumes
 - High-speed rural-like roadways within/near urban areas amplify crash severity
- COVID-19 Impact (2020-2022):**
 - Paradoxical increase in fatalities despite reduced traffic
 - Contributing factors:
 - Empty roads enabling higher speeds
 - Reduced law enforcement presence
 - Increased driver stress and risk-taking behaviors
- Environmental Factors:**
 - 75% of alcohol-impaired fatalities occurred in dark conditions
 - 39.7% in "Dark - Street Lights"
 - 18.4% in "Dark - No Street Lights"
 - Strong correlation between alcohol involvement and lighting (Cramer's $V = 0.2628$)

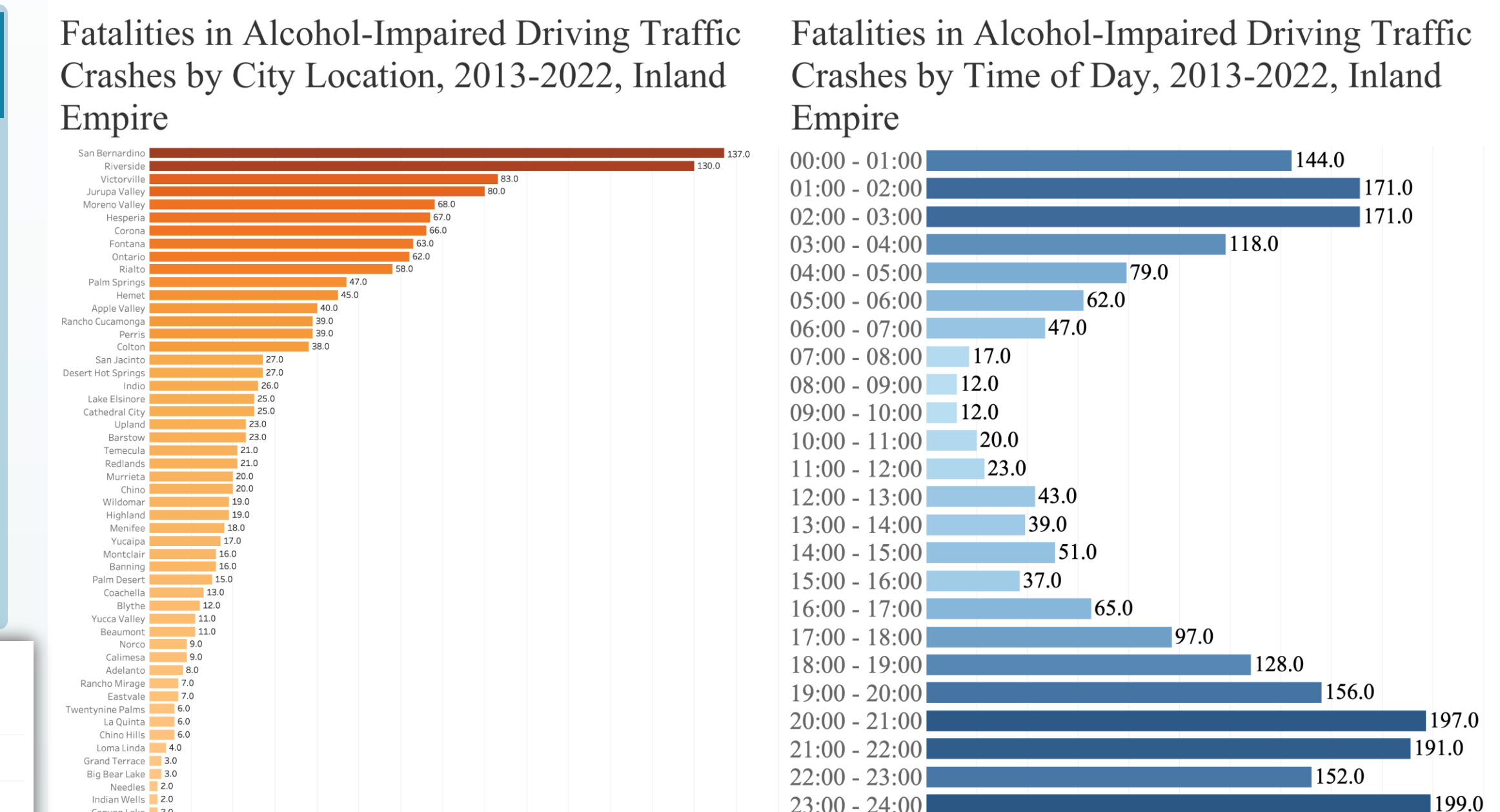
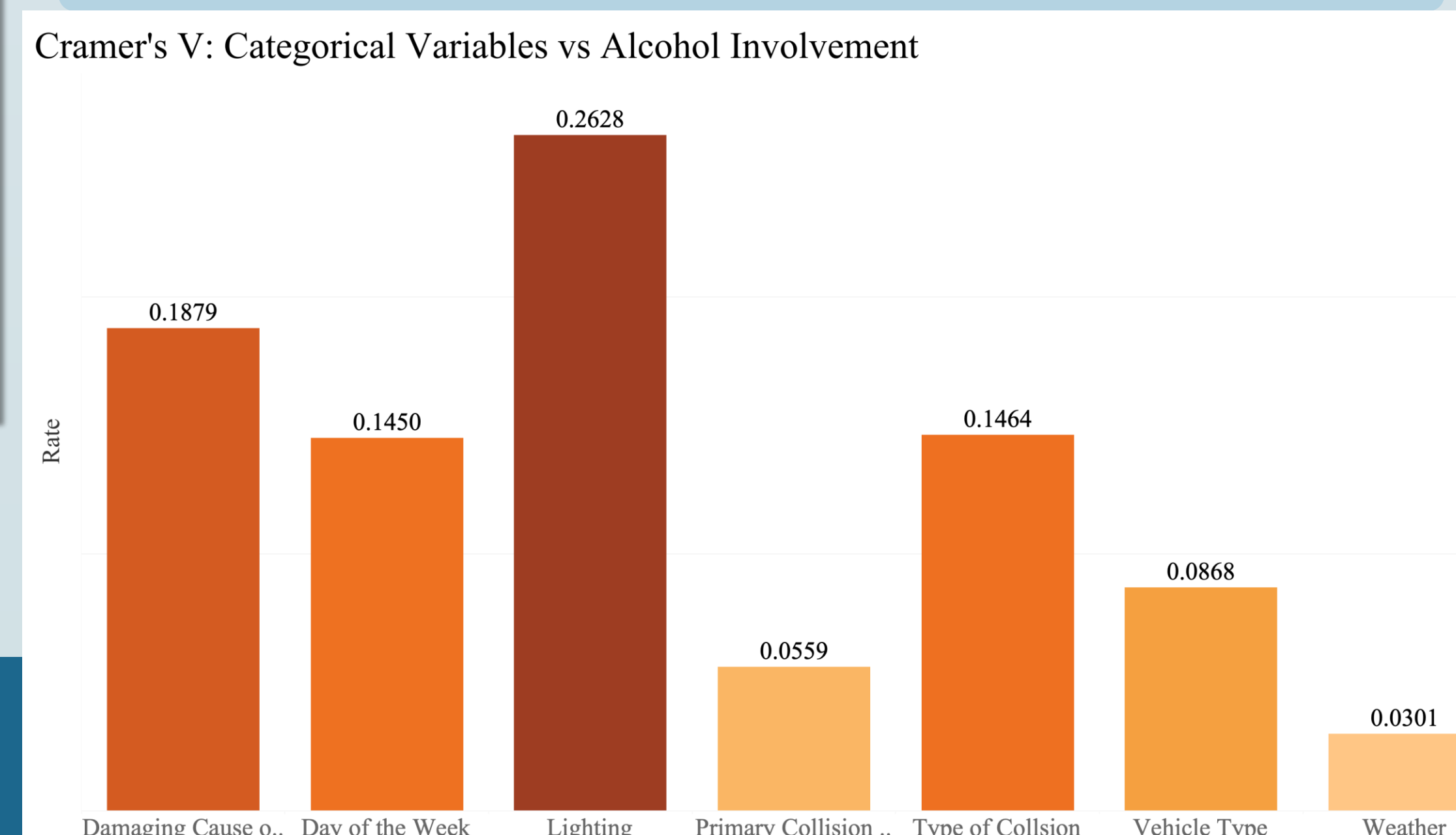


Figure 6. Distribution of Alcohol-Impaired Driving Fatalities in the Inland Empire by City Location and Time of Day (2013-2022)

Conclusion

- Unprecedented Safety Crisis:** The Inland Empire's traffic safety landscape represents a critical public health emergency, with fatality rates 40% above state averages and a Fatal Vehicle Miles Traveled (FVMT) rate 43% higher than LA County. These metrics underscore the urgent need for comprehensive, targeted interventions beyond traditional safety approaches.
- Multifaceted Risk Environment:** The region's unique urban-rural hybrid geography creates a complex risk ecosystem where standard safety strategies prove inadequate. The intersection of dense urban centers and expansive rural road networks generates multiplicative crash risks that demand innovative, location-specific solutions.
- Systemic Vulnerabilities Exposed:** COVID-19 dramatically revealed the region's transportation safety fragilities, with fatalities surging from 489 in 2013 to 800 in 2022. This increase highlights the critical importance of adaptive safety strategies that can respond to rapidly changing social and environmental conditions.
- Strategic Imperative:** Addressing the Inland Empire's traffic safety challenges requires a holistic approach that integrates infrastructure improvements, specialized enforcement, mental health considerations, and community-centered prevention programs.
- Call to Action:** Continued research and innovative interventions are essential to transforming the Inland Empire's traffic safety landscape and preventing future fatalities.

References

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- National Highway Traffic Safety Administration's (NHTSA) Fatalities Analysis Reporting System (FARS)
- Statewide Integrated Traffic Records System (SWITRS)
- Highway Performance Monitoring System (HPMS)

Figure 7. Strength of Associated (Cramer's V) Between Various Crash Characteristics and Alcohol Involvement in Inland Empire Traffic Fatalities, 2013-2022

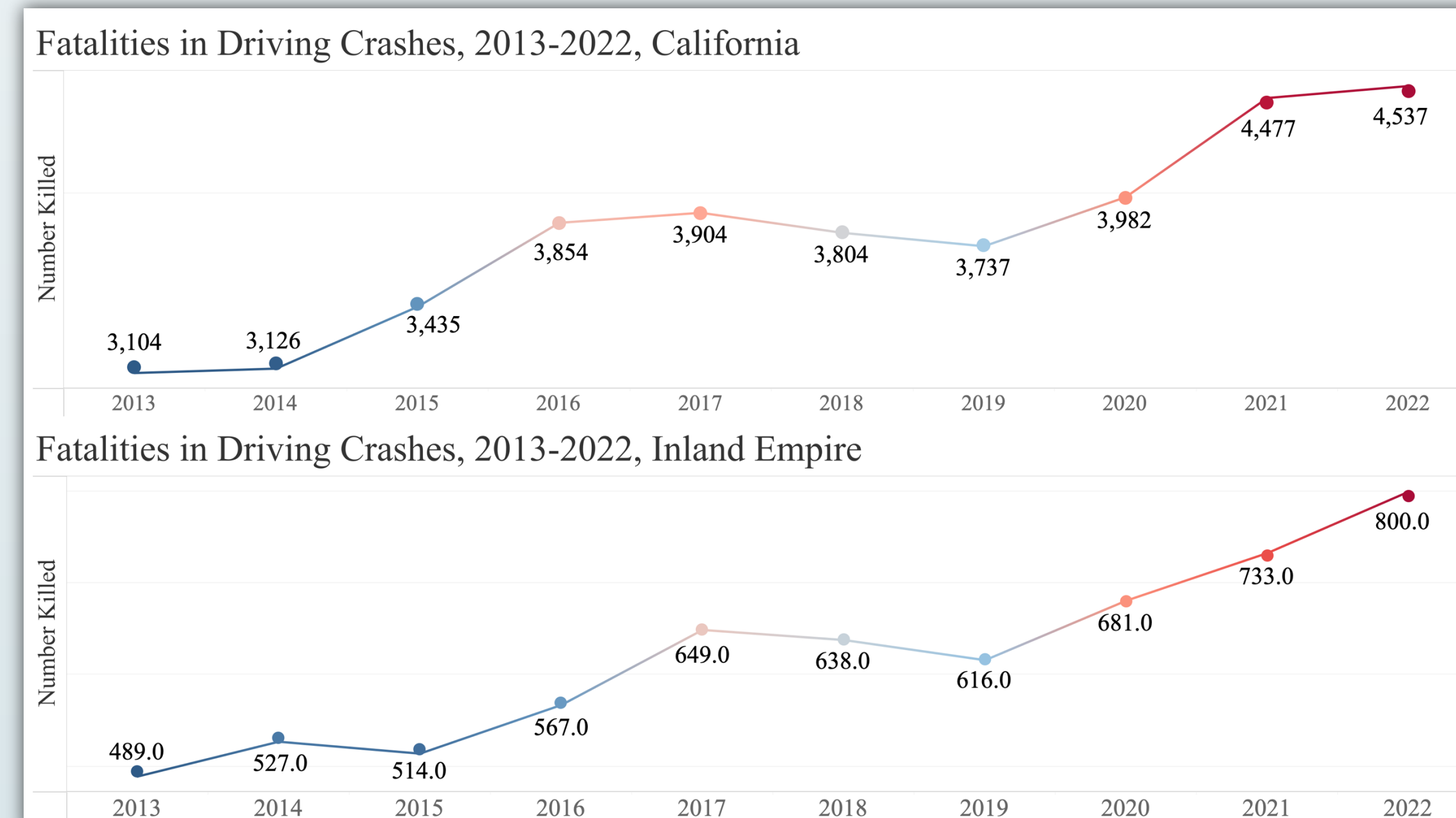


Figure 1. Comparison of Total Traffic Fatalities in California and the Inland Empire, 2013-2022

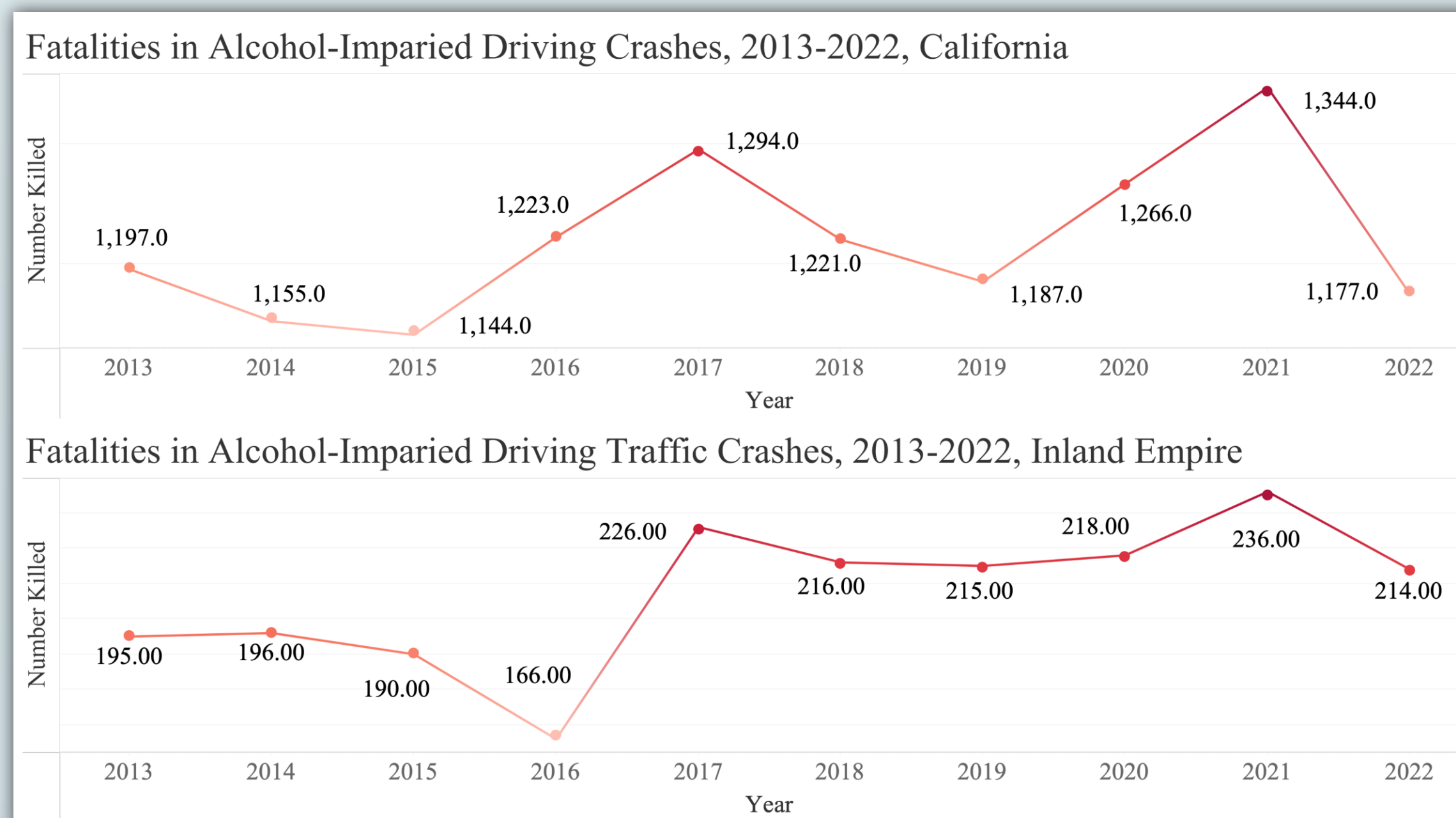


Figure 2. Comparison of Alcohol-Impaired Driving Fatalities in California and the Inland Empire, 2013-2022

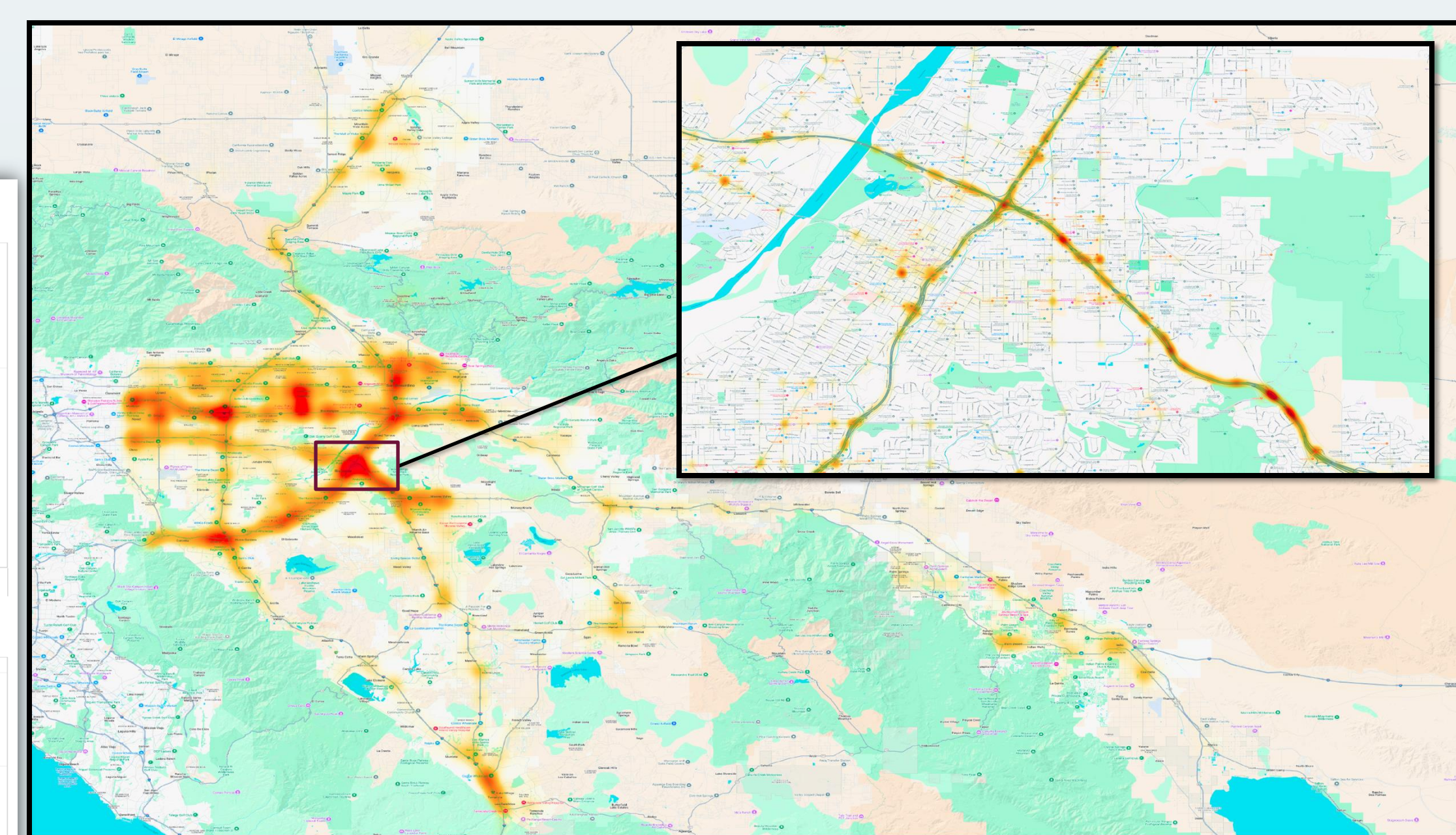


Figure 3. Heat Map of Total Traffic Accidents in the Inland Empire (2013-2022), with Inset Showing High-Density Cluster at the Intersection of Highways 91 and 60 in Riverside

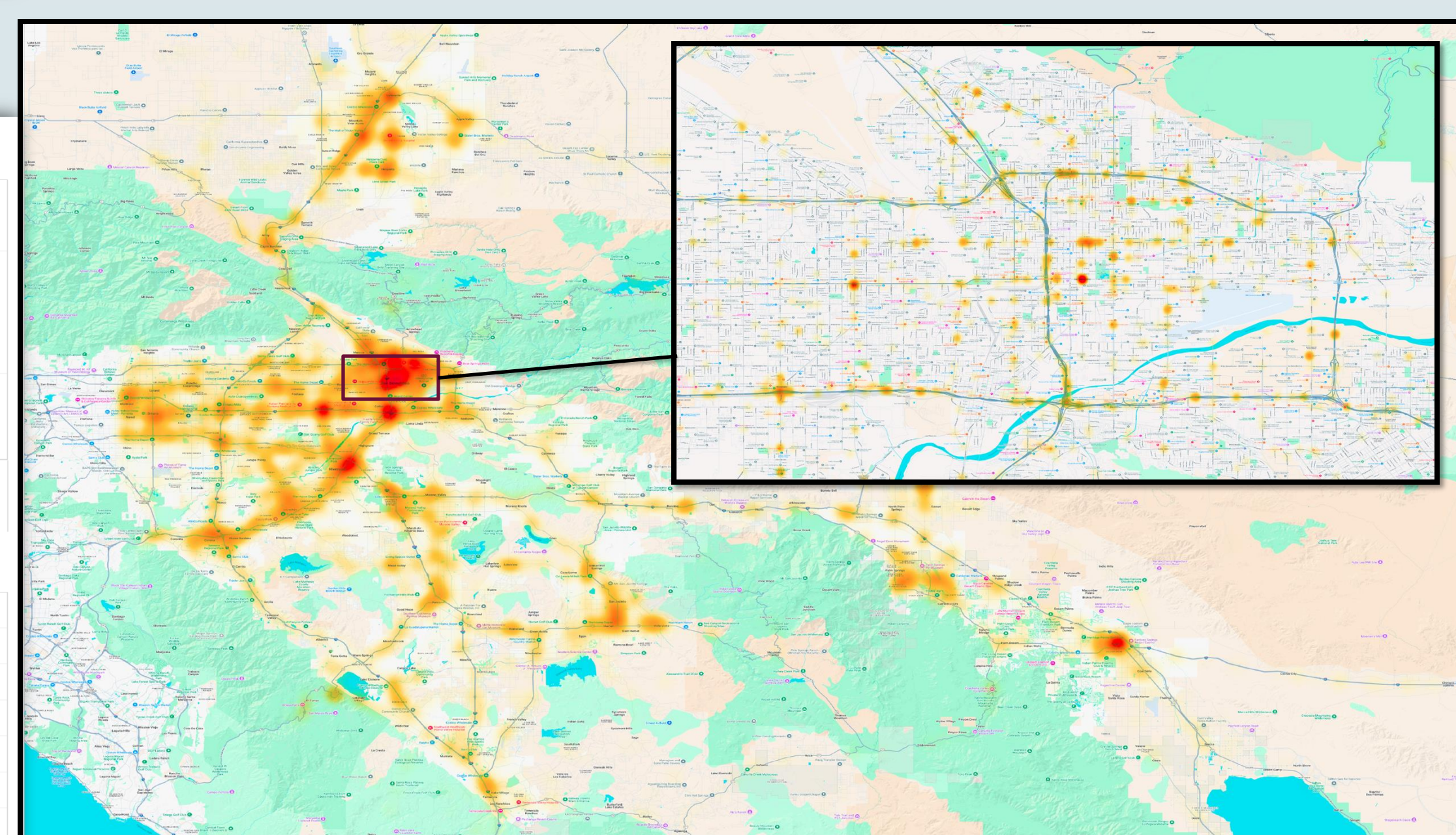


Figure 4. Heat Map of Fatal Traffic Crashes in the Inland Empire (2013-2022), with Inset Highlighting Concentrated Fatalities in San Bernardino and Dispersed Clusters Across Peripheral Cities