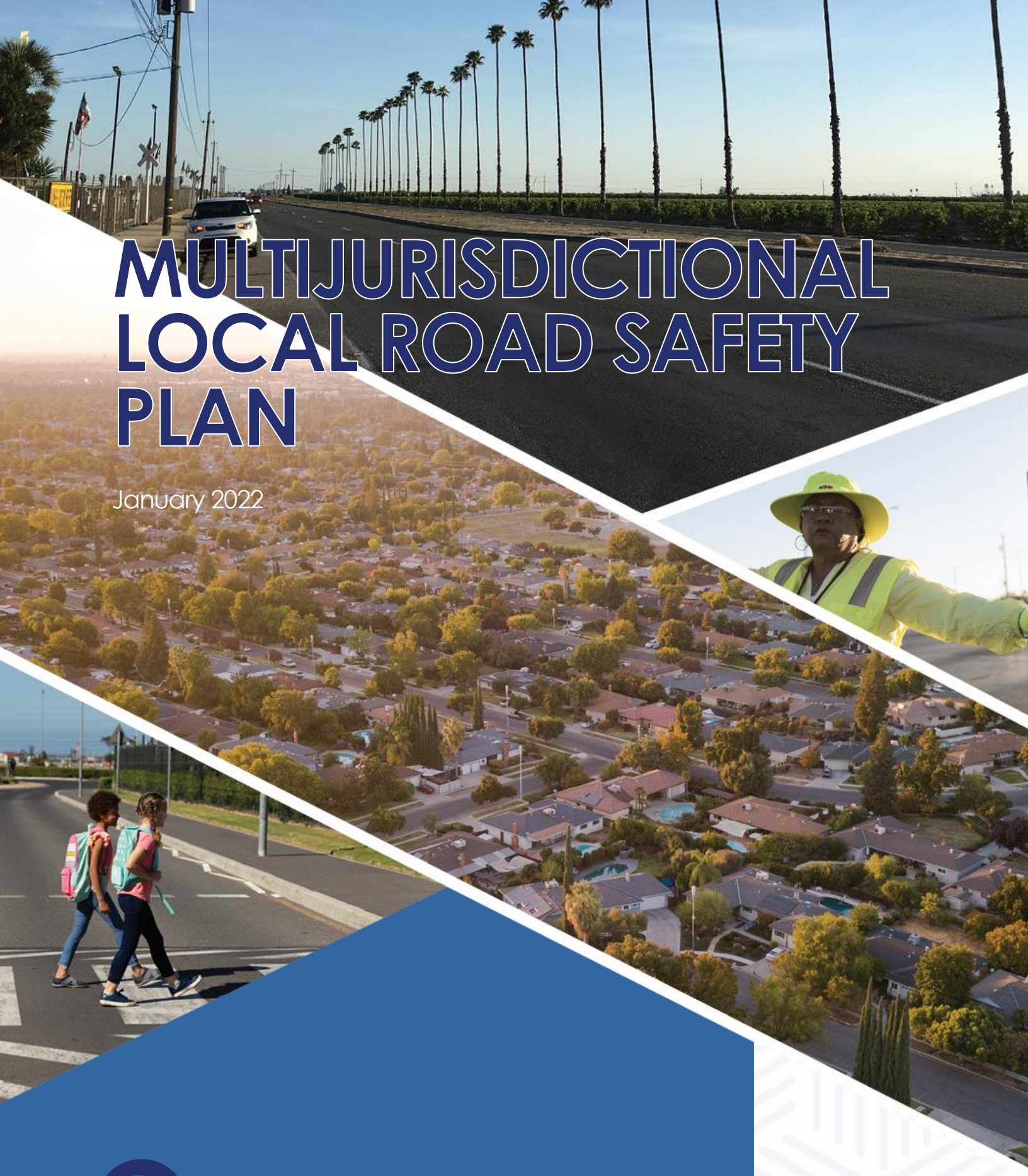

MULTIJURISDICTIONAL LOCAL ROAD SAFETY PLAN

January 2022

Fresno Council of Governments

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Prepared For:
Fresno Council of Governments
2035 Tulare St # 201
Fresno, CA 93721
559.233.4148

Prepared By:
Kittelson & Associates, Inc.
2510 J Street, Suite 200
Sacramento, CA 95816
916.266.2190
Project Manager: Mychal Loomis, PE, TE, PTOE, RSP
Deputy Project Manager: Matt Braughton, RSP

Toole Design
1322 Webster Street, Suite 208
Oakland, CA 94612
510.298.0740

Project No. 26012

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1.0 INTRODUCTION

PURPOSE AND SCOPE

The Multijurisdictional Local Road Safety Plan (MLRSP) was initiated by the Fresno Council of Governments (Fresno COG) and completed by Kittelson & Associates, Inc. (Kittelson) and Toole Design Group (TDG) to enable ten of the COG's local jurisdiction partners to prepare their first local road safety plans. The ten participating local jurisdictions are:

- City of Clovis
- City of Coalinga
- City of Firebaugh
- Fresno County (Unincorporated)
- City of Huron
- City of Kerman
- City of Mendota
- City of Orange Cove
- City of San Joaquin
- City of Selma

The focus of the MLRSP's development is to identify the following for each of the local jurisdictions:

- Crash patterns and trends
- Systemic engineering treatments to help reduce crash risk
- Education, enforcement, and/or emergency services strategies to help improve roadway safety
- High priority locations for projects with supporting design concepts
- Highway Safety Improvement Program (HSIP) grant applications to facilitate securing funding for high priority safety projects

This document presents the local road safety plans for each of the above local agencies. The local road safety plans were informed by technical analysis as well as input from key stakeholders and input from the general public. The following subsections describe the process used to develop the plans, the types of strategies identified for each local agency, and the COG's regional efforts to improve roadway safety. The subsequent sections of this report present each local jurisdiction's local road safety plan.

PROCESS

The local road safety plans included in this MLRSP were informed by a crash data analysis, key agency stakeholder input, and broader community input from the general public regarding roadway safety concerns. The stakeholder input combined with the crash analysis were used to establish an understanding of existing roadway safety performance and priority locations for each local agency. Based on existing roadway safety performance, multidisciplinary strategies were identified to help improve roadway safety. The following subsections discuss the stakeholder engagement activities, summarize the data and analysis approach used, and identify types of strategies to improve roadway safety.

Stakeholder Engagement Activities

The local road safety plans for the local jurisdictions were developed during the COVID-19 pandemic from approximately April 2021 through December 2021. Given the timing of their development, stakeholders were engaged through virtual meetings and web-based input. Engagement was organized into three sets of activities to engage a range of stakeholders over the course of the local road safety plans' development. These activities include:

Local Working Groups – Three local working groups were formed and comprised of one to three representatives from each of the ten participating local agencies. The local working groups each met three times during the local road safety plans' development to discuss existing conditions findings, vision and goals, recommendations, and the local road safety plans themselves. *Appendix A* includes the local working group rosters, meeting notes, and materials from those meetings.

Web-Based Survey and Interactive Map – A web-based survey and interactive map was used to reach the general public. The COG worked with local agencies to advertise the survey and interactive map through social media and other established communication channels. The web-based survey was used to gather input regarding people's general roadway safety concerns and understand the types of issues most frequently encountered. The interactive map was used to gather input on specific locations where community members had roadway safety concerns. *Appendix A* includes the summary of the input received.

Focus Group Meetings – One focus group meeting was conducted for each local agency. The participants were invited based on their role in the community and included representatives from local school districts, local decision-makers, city managers, representatives from local chamber of commerce, local law enforcement, transit service providers, state partners (e.g., Caltrans, California Highway Patrol), and other active local community members. Each of the ten focus group meetings discussed draft findings, shared input received from the general public, discussed draft vision and goals, and presented draft priorities as well as potential safety strategies. *Appendix A* includes the focus group participant lists, meeting notes, and meeting materials from each focus group meeting.

Data Summary and Analysis Approach

Kittelson worked with Fresno COG to assemble crash data for each of the local jurisdictions. The crash data was obtained from the Statewide Integrated Traffic Records System (SWITRS) database and supplemented with location information from the Transportation Injury Mapping System (TIMS) database maintained by SafeTREC at the University of California, Berkeley. Throughout this report, crashes are associated with a jurisdiction based on the reporting officer's assessment of location.

The crash database represents the time period from January 1, 2015 through December 31, 2019 and includes reported crashes that occurred on public streets within each local jurisdiction. Crash severity is coded according to the highest degree of injury exhibited, and the data used for this analysis includes the following coded severity levels (listed in descending order):

- **Fatal:** death from injuries sustained in the crash.
- **Severe Injury:** Injuries include, for example, broken bones, severe lacerations, or other injuries that go beyond the reporting officer's assessment of "other visible injuries."
- **Other visible injury:** An injury, other than those described above, that is evident to observers at the scene of the crash. For example, bruises or minor lacerations.
- **Complaint of pain:** Internal or other non-visible injuries. For example, a person limps or seems incoherent.
- **Property damage only (PDO):** No injuries sustained.

For simplicity in presentation, in some cases Kittelson combined crashes coded as "other visible injury" or "complaint of pain" into a single "other injury" category.

The crash data was used for two types of analysis: (i) Descriptive analysis to identify crash patterns and trends; and (ii) Spatial analysis to identify high-injury networks and priority locations for safety improvements.

The data used for the descriptive analysis were sorted into jurisdictions based on the information available in the SWITRS and TIMS databases. This information is derived from a reporting officer's judgment and may be inconsistent with true boundaries, especially near city/county borders.

1.0 INTRODUCTION

In the process of locating data into a geographic information system (GIS) for spatial analysis, Kittelson reviewed the available information and relocated some crashes to a more precise coordinate location. In so doing, Kittelson relocated some crashes to different jurisdictions than originally listed in the database. **Thus, some disparities in total crash count by jurisdiction exist between the descriptive analysis and spatial analysis even though each is internally consistent.** This subtle change in crash total per jurisdiction has a negligible effect on overall descriptive patterns.

DESCRIPTIVE ANALYSIS

The descriptive analysis evaluates the crash data based on attributes recorded by police officers in crash reports. The attributes include items such as collision type, severity, cited primary collision factor, weather, and lighting. This analysis results in different charts, tables, and graphs summarizing statistics about recurring crash patterns and trends in the data. In some instances, a few of the local jurisdictions had too few reported crashes to do a descriptive analysis. In those instances, Kittelson summarized key attributes for each reported crash. **The overall intent of the descriptive analysis is to identify jurisdiction-wide trends that may be addressed by systemic strategies or treatments.**

For each agency LRSP a section is provided for descriptive data related to all road users, pedestrians, and bicyclists. These sections provide relevant information to statewide performance measure targets which specifically look for pedestrian- and bicycle-involved crashes.

SPATIAL ANALYSIS

The spatial analysis takes into consideration the specific locations the reported crashes occurred. To aid in this analysis, Kittelson developed a linear referencing system of all public roadways using the Fresno County roadway centerline file. This dataset was updated to develop a measurement system based on the total road length (as determined by roadway name) to locate crashes to a specific mile point along the network. This allowed calculating *Highway Safety Manual* network screening performance measures using spatial statistics. Upon developing the roadway network, nodes were created for all intersections across the region and identified as signalized or unsignalized. Kittelson conducted quality control checks to ensure grade-separated crossings were appropriately modeled and address other inconsistencies in the roadway and intersection network.

Crashes were next identified as intersection or segment crashes. Based on Caltrans guidance, an intersection crash was defined as a crash that occurs within 250 feet of the intersection. These crashes were spatially joined and summarized in ArcGIS to calculate the total number of crashes by severity at each intersection. Where intersections were less than 500 feet from each other, crashes were assigned to the nearest of the two intersections. Crashes occurring more than 250 feet from any intersection were separated to be used in the segment analysis discussed below.

ANALYSIS APPROACH

The following steps outline the basic analysis approach to assess countywide safety performance:

1. Establish the high-injury network database using the crash and roadway network data.
2. Evaluate the frequency and severity of reported crashes using Equivalent Property Damage Only (EPDO) and Excess Predicted Average Crash Frequency Using Method of Moments performance metrics and sliding window methodology from the *Highway Safety Manual*. Kittelson used weighting consistent with Caltrans Local Roadway Safety Manual crash costs guidance.
3. Map resulting performance metrics to display roadway safety performance for each local jurisdiction.

As a note, roadway segments and intersections in the resulting high-injury network maps are not weighted based on travel volumes or demand. Field-collected traffic volumes and travel demand model volumes can be useful tools in weighing and classifying roads differently based on their volume and demand. However, there are limits and challenges to this data which rendered it infeasible to apply to the high-injury network in a consistent manner that would allow for comparisons within a given jurisdiction. For example, consistent traffic volumes are not available for all roads that are being analyzed. Additionally, Fresno COG's travel demand model network does not cover all roads analyzed and is not able to be directly linked to the roadway network. Therefore, all analyzed roadway segments were evaluated without adjusting for travel volumes.

High-Injury Network

In the existing conditions report, Kittelson identified high-injury networks for each local jurisdiction. A high-injury network includes the intersections and segments that have exhibited the most frequent and/or most severe crashes within a given jurisdiction. Kittelson mapped the results of the analysis and also presented the highest priority locations in a table format.

To identify the high-injury network and corresponding high priority locations, Kittelson used the same approach recently completed for Fresno COG's Regional Safety Plan (RSP). The following describes this approach which includes calculating crash severity scores, excess predicted average crash frequency, and the sliding window methodology.

Equivalent Property Damage Only (EPDO) to Generate Crash Severity Scores

Kittelson used EPDO score performance measure from the *Highway Safety Manual*, which assigns weighting factors to crashes by severity relative to property damage only (PDO) crashes. The EPDO calculation was performed for all public intersections and roadway segments including state highway facilities. The EPDO performance measure is described below. Moving forward throughout this document, the EPDO performance measure is referred to as a "crash severity score."

The crash severity score assigns weight to individual crashes based on the crash severity and location of the crash (see table below). Weights, provided by the 2020 Caltrans' Manual *Local Roadway Safety*, are based on the cost of property-damage-only (PDO) crashes. Each crash is assigned a score relative to a PDO crash, as shown in Table 1.

Table 1: Crash Severity Scores

Location Type	Crash Weighting by Severity				
	Fatal	Severe Injury	Other Visible Injury	Complaint of Pain	Property Damage Only
Signalized Intersection	119.55	119.55	10.70	6.08	1.00
Unsignalized Intersection	190.23	190.23	10.70	6.08	1.00
Roadway	164.66	164.66	10.70	6.08	1.00

Source: Caltrans, Local Roadway Safety: A manual for California's Local Road Owners (Version 1.5), 2020.

The weights prioritize fatal and severe injury crashes equally to recognize that a death versus a severe injury is often a function of the individual involved or of emergency response time. Therefore, both outcomes represent locations where the region may want to prioritize improvements. Crash weights vary by location types because of the relative costs associated with the crash severity at the location type. Specifically, unsignalized intersections have a higher cost for fatal and severe crashes because fatal and severe crashes at these locations tend to result in more severely injured persons on average.

The EPDO score is calculated by multiplying each crash severity total by its associated weight and summing the results, using the following formula:

EPDO Score = (Fatal weight * # of fatal crashes) + (severe injury weight * # of severe injury crashes) + (other visible injury weight * # of other visible injury crashes) + (complaint of pain injury weight * # of complaint of pain injury weight crashes) + (property damage only weight * # of property damage only crashes)

The EPDO score is annualized by dividing the score by the number of years of crash data used in the analysis, which in this case is five years.

Excess Predicted Average Crash Frequency Using Method of Moments

Kittelson also used the Excess Predicted Average Crash Frequency Using Method of Moments performance metrics to calculate the predicted excess crash frequency for each analysis segment and intersection. This method identifies the extent to which a location is exhibiting either more crashes or fewer crashes than one would expect based on how other similar locations are performing.

Mathematically, this method adjusts the observed crash frequency for a site based on the variance in the crash data and average crash frequencies for a site's reference population. Reference populations were established based on urban/rural designation, functional classification, and traffic control (for intersections only). The adjusted observed crash frequency is then compared to the average crash frequency for the reference population to calculate the excess predicted crashes for each location.

Sliding Window Methodology

Kittelson used a Python-based script to segment the street network into one-half (1/2) mile segments, incrementing the segments by one-quarter (1/4) of a mile. The EPDO score was calculated per increment of each segment as the script "slides" along each roadway in the network. Crashes associated with intersections (i.e., crashes within 250 feet of the intersection) are ignored for the segment analysis and analyzed separately. This methodology helps to identify portions of roadways with the greatest potential for safety improvements. The scores were aggregated based on relative regional percentiles of the resulting crash severity and excess predicted crashes scores to map out regional safety performance and identify high injury locations.

Results

The results of the above spatial analysis are presented for each local jurisdiction under the subsection titled "Existing Roadway Safety Performance." Grade-separated facilities were removed from the evaluation as they would not be a focus for the local agency. The results are a strong indication of which locations are most likely to be competitive for HSIP grant funding. The results were used to inform the selection of locations for HSIP grant applications.

Strategy Types

Strategies to improve roadway safety were identified for each local agency based on that agency's existing roadway safety performance and the concerns identified by stakeholders as well as the general public. The safety strategies identify engineering strategies (i.e., countermeasures), education, emergency services, and enforcement strategies that can be used to reduce the risk of traffic fatalities and injuries on public roadways. The following briefly describes each type of strategy. Each agency's local road safety plan describes specific strategies aligned with the local agency's emphasis areas for road safety improvement.

ENGINEERING STRATEGIES

Engineering strategies to improve roadway safety are often referred to as countermeasures. Countermeasures are generally geometric or operational changes to a roadway, intersection, or roadside (area immediately adjacent to the roadway) that reduce the likelihood of a crash occurring and/or reduce the likelihood of someone being killed or hurt if a crash does occur.

The Fresno COG 2021 Regional Safety Plan (RSP) includes a Countermeasures Toolbox, which is provided in *Appendix B* of this MLRSP. The toolbox is a resource for local agencies within the region. It is organized to help identify countermeasures that have been found to be effective at reducing crash risk. The engineering strategies included are likely to be eligible for grant funding through Caltrans' HSIP.

Specific to each local agency's road safety plan, countermeasures were prioritized based on the top three collision types and top three primary collision factors. The Fresno COG RSP Countermeasure Toolbox and Caltrans' Manual *Local Roadway Safety* were used to identify which collision types and primary collision factors a countermeasure is most effective at addressing. Using this information, countermeasures were prioritized as follows:

- If the collision type or primary collision factor was listed in the Top 3 Fatal/Severe Injury list for a jurisdiction, then the countermeasure was given **high priority**.
- If the collision type or primary collision factor was listed in the Top 3 Overall list for a jurisdiction (but not the Top 3 Fatal/Severe Injury list), then the countermeasure was given a **medium priority**.
- If the collision type or primary collision factor was not listed as Top 3 for a jurisdiction, then the countermeasure was given a **low priority**.

For countermeasures that address night crashes, the following prioritization process was used:

- If the proportion of fatal/severe injury crashes that occurred at night in a jurisdiction were greater than the countywide proportion of fatal/severe crashes that occurred at night (44 percent), then the countermeasure was given **high priority**.
- If the proportion of fatal/severe injury crashes that occurred at night in a jurisdiction were less than the countywide proportion of fatal/severe crashes that occurred at night, but greater than the countywide proportion of total crashes that occurred at night (32 percent), then the countermeasure was given **medium priority**.
- If the proportion of fatal/severe injury crashes that occurred at night in a jurisdiction were less than the countywide proportion of total crashes that occurred at night, then the countermeasure was given a **low priority**.

For countermeasures that address crashes involving pedestrians and bicyclists, the collision types, primary collision factors, and pedestrian actions that were associated with pedestrian and bicycle involved crashes informed countermeasure priorities. The following were also considered:

- If pedestrian and bicycle involved crashes in a jurisdiction exceeds statewide average shown in the SHSP, then the countermeasure was given **high priority**.
- If pedestrian and bicycle involved crashes in a jurisdiction do not exceed statewide average shown in the SHSP, then the countermeasure was given **medium or low priority**.

Additional factors, such as land use context (urban vs. rural land uses), estimated amount of crash reduction, and funding eligibility were also used to prioritize potential countermeasures for a given jurisdiction.

EDUCATION STRATEGIES

Education strategies tend to refer to programs aimed at distributing educational messages and materials to the general public or specific groups within the broader population to bring awareness to the need for changes in road user behavior. These strategies focus on educating or sharing information that encourages safe choices on the behalf of all road users. Implementing these strategies often requires inter- and intra-agency coordination to achieve the desired outcomes of the program. Partners most frequently involved in developing and employing education strategies include public works department or division, transportation department or division, schools and school districts, community groups or community centers, public information offices of local agencies, and local law enforcement agencies. A transportation safety education program was created as part of the Fresno COG's 2021 Regional Safety Plan development. The COG's intent is to coordinate with local agencies across the County in deploying and using education materials. Each local agency's local road safety plan discusses opportunities to make the most of that education program as well as other related education strategies.

EMERGENCY SERVICES STRATEGIES

Emergency services strategies are programs and/or policies that facilitate coordination with emergency/first responders to improve roadway safety. These types of strategies can include:

- Agreements for enhanced information sharing to better understand severity outcomes from crashes.
- Enhanced communication and coordination to help optimize response times to/from incidents and medical care.
- Increased trauma training for first responders particularly in rural areas where travel to a hospital will take longer so stabilization and treatment at the site of the crash is more critical.
- Increased training opportunities for the general public to assist victims at the scene of a crash.

These types of strategies are often coordinated at a regional level given the overlap in services and coverage across multiple local boundaries. Each local agency's local road safety plan highlights strategies that could be beneficial to coordinate with the COG and others regarding emergency services.

ENFORCEMENT STRATEGIES

Enforcement strategies include programs or campaigns specifically focused on changing road user behavior through more visible and active enforcement of existing traffic laws. Typically, the effectiveness of enforcement strategies is temporal, meaning they are effective at changing behavior for a discrete period of time, typically during and shortly after the increased enforcement activities.

If enforcement strategies are to improve overall safety in a community, traffic laws must be applied equitably and with sensitivity toward communities where there may be limited rapport with law enforcement. Enforcement strategies should be undertaken with due caution to avoid inequitable enforcement activities and evaluated to determine the strategy's impact. The following considerations can help lead to more successful outcomes for roadway safety enforcement strategies:

- Appropriately train police officers and periodically refresh police officers' training related to enforcement activities.
- Incorporate social equity considerations in camera placement for automated enforcement, such as red-light-running cameras.
- Dedicate a portion of enforcement revenue to outreach and engagement with community groups about roadway safety.
- Tailor enforcement campaigns to suit the needs of different neighborhoods and demographics and incorporate education as part of those campaigns.
- Conduct enforcement with staff support and awareness of the courts.
- Use warnings and flyers before moving on to issuing citations.

Crash data can help identify priority intersections and/or road segments and the times of day when certain behaviors may be more prevalent. This information can inform and help officers choose the most appropriate type of enforcement strategy for a given location and time period. The COG or local agency staff can also help monitor the impact of the enforcement strategy by coordinating with the respective agency's police department to obtain and analyze enforcement records and evaluate effectiveness and equity considerations.

REGIONAL EFFORTS

The Fresno COG is committed to integrating safety into its transportation planning and funding processes. As part of that commitment, the COG has developed a Regional Safety Plan over the course of 2021. The Regional Safety Plan sets forth a roadway safety vision for the entire county and provides information and strategies to help the COG and its member agencies make decisions that will improve roadway safety through projects, policies, programs, and funding decisions. It was developed in partnership with COG member agencies through engagement with a Regional Safety Steering Committee.

In addition to providing a regional assessment of roadway safety, the Regional Safety Plan pinpoints areas where regionwide coordination on education, enforcement, data collection, data maintenance, and other strategies can benefit each local agency's progress towards achieving their local roadway safety vision and goals. The Regional Safety Plan is also a resource for local agencies to:

- Gauge how their roadway safety performance compares to regional trends
- Identify systemic engineering countermeasures from the Regional Safety Plan's Countermeasure Toolbox that can be applied to locations within their jurisdiction
- Obtain educational materials that are ready for use and can be distributed in various forums to promote safer behavior on the region's roadways
- Gather information on ways to coordinate further with local and state law enforcement
- Identify potential funding sources for improvements the local agencies have identified
- Gather information that can be used in support of grant funding pursuits

The content of the Regional Safety Plan was used to help inform the ten local road safety plans included in this document. Future updates to these or other local road safety plans within the region can also draw from the information in the Regional Safety Plan.

2.0 CITY OF CLOVIS

The City of Clovis has a population of 116,609.[1] The average daily vehicle miles traveled is 1,336,661 and the city has 669 total road miles. The main roadways in the city include State Route 180, State Route 168 (Sierra Freeway), Herndon Avenue, and Shaw Avenue, which all run east to west. Based on the review of crash data conducted as part of the LRSP, pedestrians and bicyclists are overrepresented in fatal and severe injury crashes. The top three fatal and severe injury collision types in Clovis are **broadside**, **vehicle-pedestrian**, and **hit object** crashes; the top three fatal and severe injury primary collision factors are **pedestrian violation**, **driving under the influence**, and **unsafe speed**. The LRSP provides potential engineering, education, emergency services, and enforcement strategies tailored to Clovis's crash history and local priorities, as well as performance measures to evaluate progress.

VISION AND GOALS

The City's vision for roadway safety is:

Provide a quality transportation network by committing resources to activities that reduce the risk of fatal and injury crashes for people traveling on public roads.

The supporting goals to enable the visions are:

1. Regularly review data-informed analysis and community needs to identify and prioritize opportunities to reduce crash risk.
2. Reduce the number of annual fatal and severe injury crashes across all public City roadways.
3. Reduce the number of pedestrian and bicycle crashes on public City roadways.
4. Implement proven roadway safety countermeasures systemically to target common collision types.
5. Partner with other local agencies to promote roadway safety as a priority investment.
6. Provide opportunities for citizen engagement in identifying issues and developing solutions for roadway safety across the community.
7. Establish regular communication between first responders and City staff to discuss ideas, trends, and feedback related to emergency service operations on the roadway network.
8. Increase implementation of traffic safety education and equitable enforcement strategies.

[1] 2018 population. Source: California Department of Finance

SAFETY PARTNERS

A variety of agency staff and community partners were involved throughout the development of this LRSP and played an integral role in identifying priorities, providing local context, and reviewing the existing conditions analysis. Many of the strategies identified in this plan will require coordination with these partners and their support of the City's effort to create a culture of roadway safety. Clovis's goals reflect the importance of partnering with local agencies and engaging with citizens to identify issues and implement solutions. While additional partners may be identified in the future, those involved in development of the LRSP include:

- Caltrans
- City of Fresno
- Clovis Community College
- Clovis Department of Planning and Development Services
- Clovis Department of Public Utilities
- Clovis Fire Department
- Clovis Police Department
- Clovis Public Affairs and Information
- Clovis Transit
- Clovis Unified School District
- County of Fresno
- Fresno Area Express
- Fresno Council of Governments
- Fresno Cycling Club

PERFORMANCE MEASURES

Performance measures are used to track progress and a key element of making data-informed decisions. Performance measures that support the City's vision, goals, and emphasis areas include:

- Annual number of crashes (city-wide and at each of the top twenty priority locations)
- Annual number of fatal and severe injury crashes (city-wide and at each of the top twenty priority locations)
- Annual number of pedestrian and bicycle crashes (city-wide and at each of the top twenty priority locations)
- Annual number of broadside crashes (city-wide)
- Annual number of hit object crashes (city-wide)
- Annual number of crashes with a primary collision factor of unsafe speed (city-wide)
- Annual number of crashes with a primary collision factor of driving or bicycling under the influence of alcohol or drugs (city-wide)
- Investments made in roadway safety countermeasures (e.g. dollars spent, grants pursued, partnerships developed)
- Investments made in education and enforcement strategies (e.g. dollars spent, grants pursued, partnerships developed)

- Coordination with other local agencies and/or safety partners (e.g. meetings held, projects pursued)
- Opportunities provided for citizen engagement (e.g. meetings held, public campaigns launched)
- Coordination between first responders and City staff (e.g. meetings held, programs implemented, strategies deployed)

As part of plan implementation, the City will identify a process for annually tracking these performance measures to support future updates to this roadway safety plan.

DATA SUMMARY

The primary data used to inform the technical analyses for the City's local road safety plan were crash data sets and roadway network information. As noted below, future updates could incorporate traffic volume data if widely available for locations across the City. In addition, feedback from a publicly available survey was documented for consideration in identifying issues and improvement strategies.

Public Survey Feedback

Toole Design Group worked with Fresno COG to develop an online survey and interactive webmap to provide the opportunity for public engagement on the LRSP. The goal was to collect both general and geographically specific feedback on safety problems, desired safety improvements in jurisdictions that are part of the MLRSP, as well as voluntary demographic information for Title IV reporting. Both activities were open from August 16, 2021 to September 20, 2021 and sought public feedback on spatial patterns of traffic safety concerns and desired improvements.

As the primary open public engagement opportunity during MLRSP development, the survey and interactive webmap served a crucial role in illuminating the community's traffic safety concerns and desired traffic safety improvements. Below is a summary of key findings from the online survey and interactive webmap specific to Clovis. More information on the methodology and overall findings of the survey are provided in *Appendix A*.

92
PEOPLE RESPONDED

16
LOCATIONS IDENTIFIED

WHERE PARTICIPANTS WORK AND LIVE

Work/study in Clovis and live outside of Clovis **15%**

Live and work/study in Clovis **37%**

Live in Clovis and work/study outside of Clovis **48%**

MOST COMMON SAFETY CONCERNS

- Lack of safe places to walk, bike, or wait for the bus
- Lack of safe opportunities to cross the street

- The survey asked respondents to provide input on the top road safety improvements needed in their communities. While the survey prompted participants to pick three improvements, some selected more than three responses. A total of 234 responses were received for Clovis from 92 participants, with the most common desired improvement types including:
  - Maintenance of existing roads and streets (68 responses)
  - Rural road improvements to prevent run-off-road crashes (33 responses)
  - Speed enforcement (27 responses)
- Participants dropped points in the webmap in specific locations across Fresno County where they experienced road safety concerns. When leaving a point, participants could select from a list of traffic safety concerns and the kinds of travel impacted, with the ability to select as many responses as applicable. A text box gave participants the option to note what they think would make the location safer. A total of 16 locations were identified in Clovis. The most common traffic safety concerns noted for Clovis include:
  - Lack of safe places to walk, bike, or wait for the bus (10 responses)
  - Lack of safe opportunities to cross the street (10 responses)
- The survey asked participants where they live and work or study, with the option to select either outside of Fresno County or from a list of jurisdictions within the County. Clovis was the most commonly chosen location both for where participants live and where they work or study. The participants who selected Clovis included:
  - 34 who live and work/study in Clovis
  - 44 who live in Clovis and work/study outside of Clovis
  - 14 who work/study in Clovis and live outside of Clovis

Crash Data

Kittelson worked with Fresno COG to assemble crash data for the City of Clovis using the Statewide Integrated Traffic Records System (SWITRS) database, supplemented with location information from the Transportation Injury Mapping System (TIMS) database maintained by SafeTREC at the University of California, Berkeley. Throughout this report, crashes are associated with a jurisdiction based on the reporting officer's assessment of location.

The crash database represents the time period from January 1, 2015 through December 31, 2019 and includes reported crashes that occurred on public streets. Within the assembled regional crash database, a total of 3,507 reported crashes are located in Clovis.

Crash severity is coded according to the highest degree of injury exhibited, and the data used for this analysis includes the following coded severity levels (listed in descending order):

- Fatal: death from injuries sustained in the crash.
- Severe Injury: Injuries include, for example, broken bones, severe lacerations, or other injuries that go beyond the reporting officer's assessment of "other visible injuries."
- Other visible injury: An injury, other than those described above, that is evident to observers at the scene of the crash. For example, bruises or minor lacerations.
- Complaint of pain: Internal or other non-visible injuries. For example, a person limps or seems incoherent.
- Property damage only (PDO): No injuries sustained.

Roadway Network Data

Kittelson developed a linear referencing system of all public roadways using the Fresno County roadway centerline file. This dataset was updated to develop a measurement system based on the total road length (as determined by roadway name) to locate crashes to a specific mile point along the network. The master roadway network for the County was used to spatially analyze and prioritize specific locations within each local jurisdiction.

Traffic Volume Data

Traffic volume data was not consistently available at a sufficient level to be able to incorporate into the safety analysis. Future updates to the City's local road safety plan could incorporate traffic volume data, if available, to understand how crash frequency, severity, and type vary at different levels of traffic.

EXISTING ROADWAY SAFETY PERFORMANCE

The findings in this section are based on the crash database, which includes reported crashes from January 1, 2015 through December 31, 2019. It is organized as follows:

- All Road Users
  - Severity by Road User
  - Year, Month, and Weather
  - Collision Type
  - Location, Collision Type, and Severity
  - Primary Collision Factor
  - Lighting
  - Time of Day
- Pedestrian-involved Crash
  - Year and Month
  - Pedestrian Action and Location
  - Lighting
- Bicyclist-involved Crashes
  - Collision Type
  - Primary Collision Factor
  - Lighting

All Road Users

This section includes analysis and findings for all reported crashes. Subsequent sections focus exclusively on crashes involving pedestrians and bicyclists.

SEVERITY BY ROAD USER

Table 2 presents reported crashes, organized by severity level and road user. Notable trends include:

- Pedestrians are overrepresented in fatal and severe injury crashes. Pedestrians are involved in 3 percent of reported crashes but are involved in 27 percent of fatal/severe injury crashes.
- Bicyclists are also overrepresented in fatal and severe injury crashes. Bicyclists are involved in 3 percent of reported crashes but 9 percent of fatal/severe injury crashes.

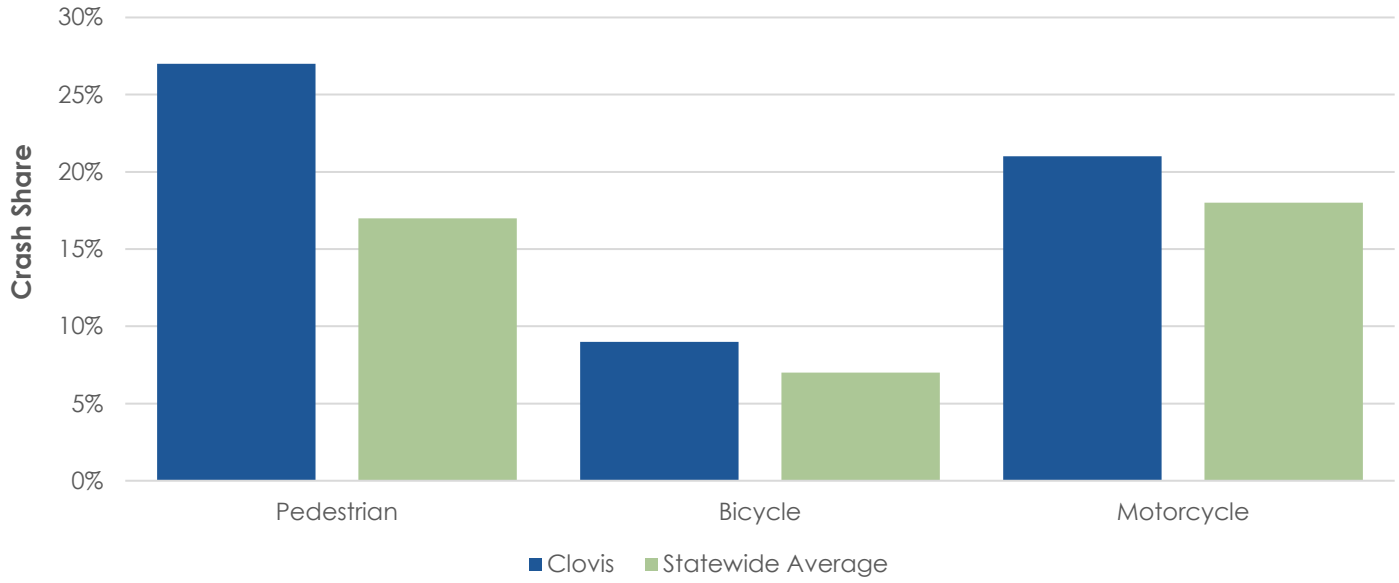
Table 2: Crash Severity by Road User Involved

Road User Involved	Fatal (% of column)	Severe Injury (% of column)	Visible Injury (% of column)	Complaint of Pain (% of column)	Property Damage Only (% of column)	Total (% of column)
Pedestrian Involved	4 (40%)	11 (24%)	25 (9%)	41 (4%)	9 (1%)	90 (3%)
Bicycle Involved	1 (10%)	4 (9%)	31 (11%)	59 (6%)	23 (1%)	118 (3%)
Vehicle Only or Vehicle-Fixed Object	5 (50%)	31 (67%)	221 (80%)	941 (90%)	2,101 (98%)	3,299 (94%)
Reported Crashes	10 (100%)	46 (100%)	277 (100%)	1,041 (100%)	2,133 (100%)	3,507 (100%)
Severity Share of Reported Crashes	1%	1%	8%	30%	60%	100%

Source: SWITRS, TIMS, Kittelson, 2021.

The California's Strategic Highway Safety Plan (SHSP) includes 16 challenge areas to focus statewide resources and efforts. Three of those challenge areas are crashes involving pedestrians, bicyclists, and motorcyclists. The SHSP analyzed the share of fatal and severe injury crashes involving each of these road users. Figure 1 compares fatal and severe injury crash trends in Clovis to the statewide trends reported in the SHSP.

Figure 1: Fatal and Severe Injury Crash Shares by Road User Compared to Statewide Trends



Source: SHSP, SWITRS, TIMS, Kittelson, 2021.

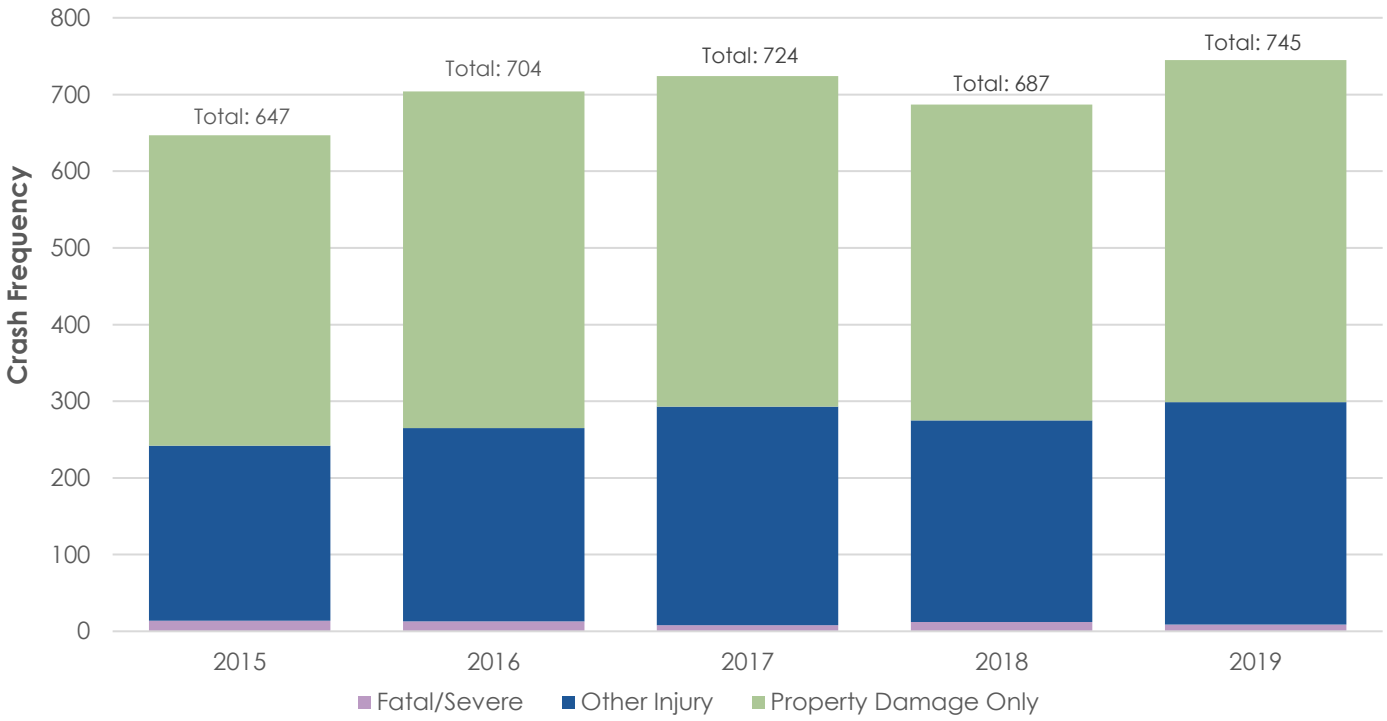
As shown in the figure:

- Clovis has a higher share of fatal/severe injury crashes involving pedestrians than the statewide average.
- Clovis has a slightly higher share of fatal/severe injury crashes involving bicyclists than the statewide average.
- Clovis is the only jurisdiction among those included in this MLRSP that has a higher share of motorcyclists involved in fatal/severe injury crashes than the statewide average: 21 percent compared to 18 percent statewide.

YEAR, MONTH, AND WEATHER

Figure 2 shows year-over-year trends in the data by severity. The totals reflect a relatively small but steady increase, with an average of 701 annual crashes and 11 fatal/severe injury crashes annually. Fluctuations from a single year to the next tend to represent the degree of randomness in crash occurrence and are not necessarily indicative of an overall trend.

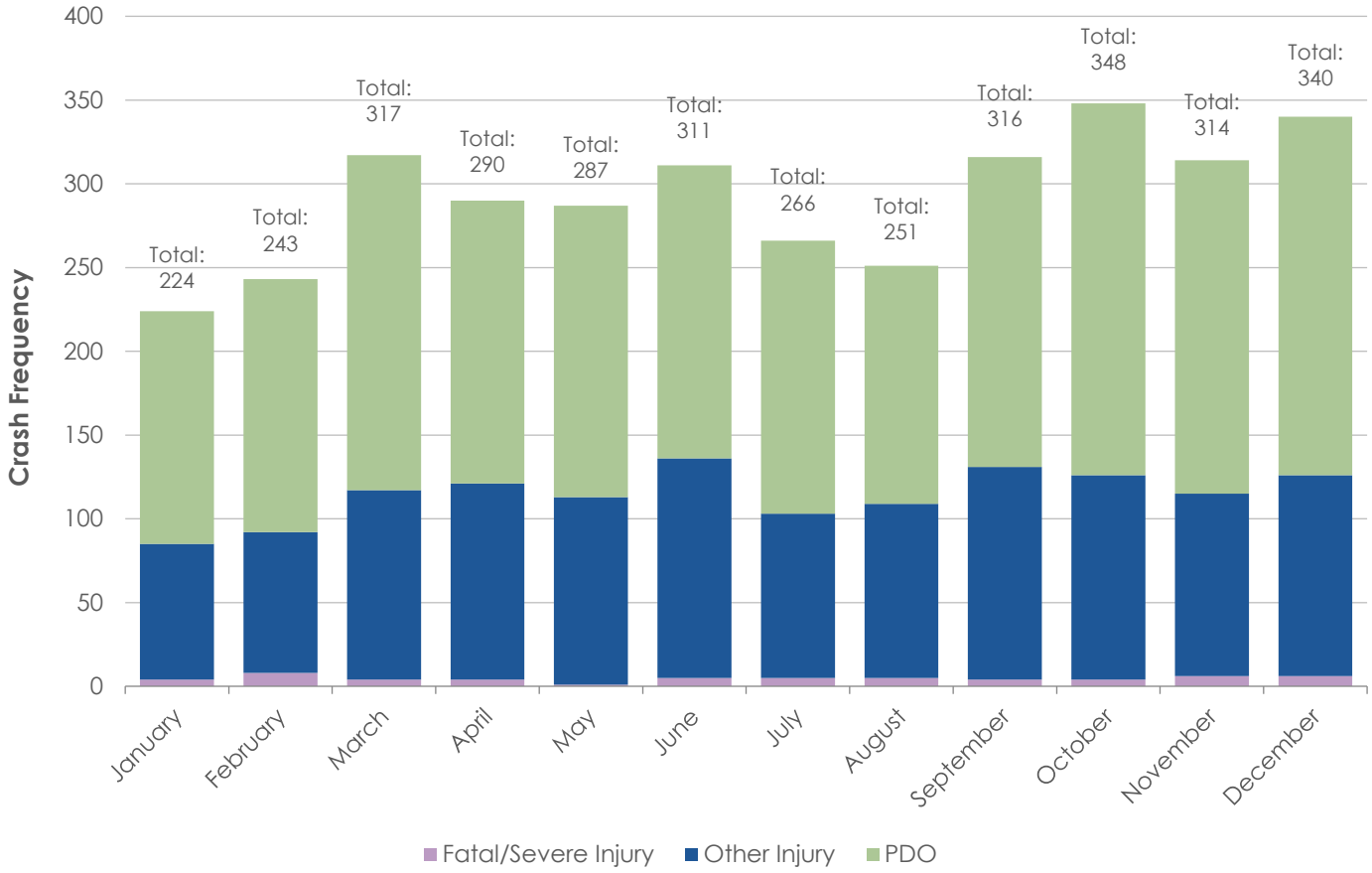
Figure 2: Year-over-Year Trends in Crash Data by Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes.

Figure 3 presents the total crashes by month and severity for the crash database. On average, 292 crashes occurred per month. The lowest number of crashes occurred in January and in February, with a total of 224 crashes in January and 243 crashes in February. The highest number of crashes occurred in October, when 348 crashes occurred.

Figure 3: Crashes by Month and Severity

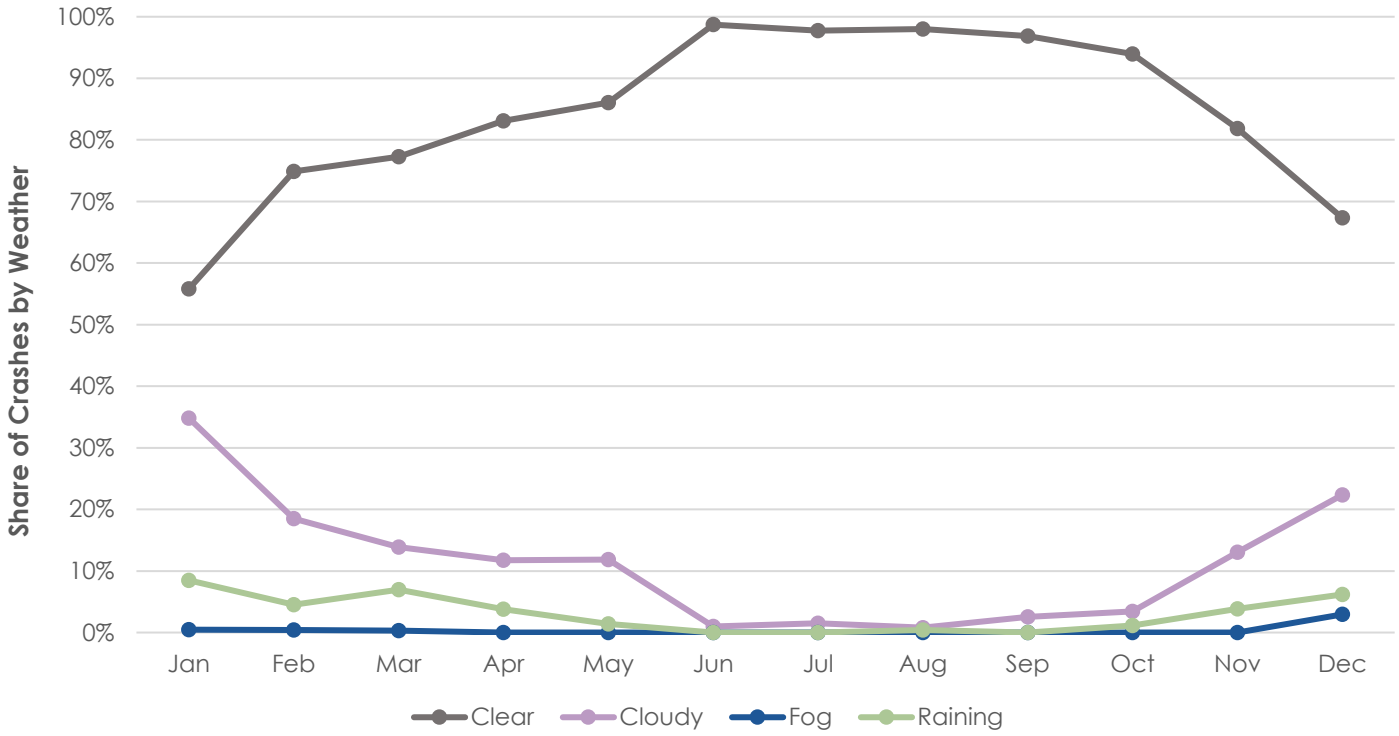


Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

Figure 4 illustrates crashes by month and by weather condition for the full database. As shown in the figure:

- Crashes cited to have occurred during fog and/or rainy conditions are a larger portion of total crashes between the months of October and March.
- Crashes cited to have occurred during cloudy weather are a larger portion of total crashes between the months of November and May.

Figure 4: Crashes by Month and Weather Condition



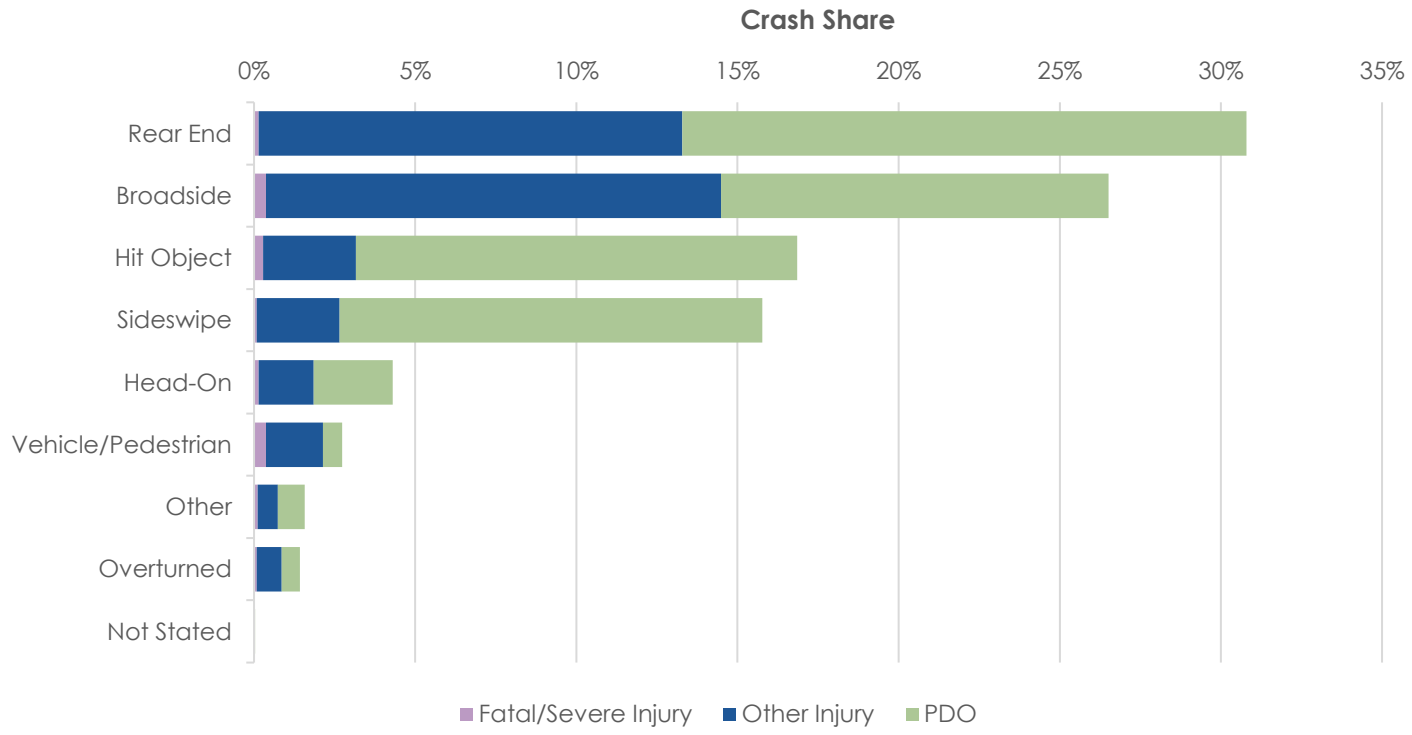
Source: SWITRS, TIMS, Kittelson, 2021.
Note: Only select conditions shown to improve legibility. A small portion of crashes occurred in snowy or windy conditions.

COLLISION TYPE

Reported collision type gives an indication of the movements most frequently involved in crashes and in severe outcomes. Figure 5 reports the most frequent reported collision types by severity. As shown in the figure:

- Among total reported crashes, the top three most frequent collision types are **rear end** (31 percent), **broadside** (27 percent), and **hit object** (17 percent). These three collision types account for 75 percent of reported crashes in the City.
- Among fatal/severe injury crashes, the top three most frequent collision types are **broadside** (23 percent), **hit object** (18 percent), and **vehicle/pedestrian** (23 percent). These three collision types account for 64 percent of reported fatal/severe injury crashes in the City.

Figure 5: Crashes by Collision Type and Severity



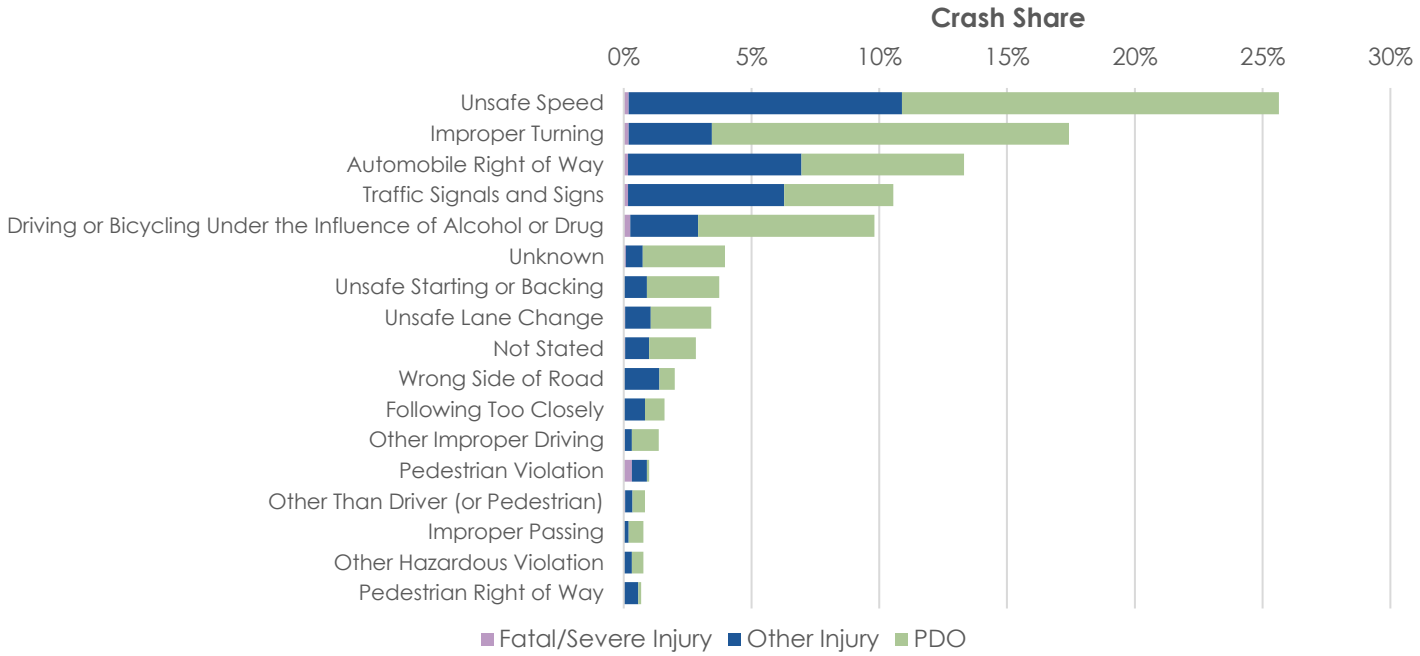
Source: SWITRS, TIMS, Kittelson, 2021
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

PRIMARY COLLISION FACTOR

Reporting officers identify a primary collision factor (PCF) for each crash. It is up to the officer's judgement and information available at the scene for them to select the factor that is most relevant. Officers select one from among a list of PCFs based on California Vehicle Code (CVC) and road user behavior. Figure 6 presents the most frequently cited PCFs in crashes in the City.

- The three most frequently reported PCFs among total reported crashes include **unsafe speed**[2] (26 percent), **improper turning**[3] (17 percent), and **automobile right of way**[4] (13 percent). These three PCFs account for 56 percent of reported crashes.
- The three PCFs most frequent among fatal/severe injury crashes are **pedestrian violation**[5] (20 percent), **driving or bicycling under the influence of alcohol and drugs**[6] (16 percent), and **unsafe speed**[2] (13 percent) – a total of 49 percent among all three.

Figure 6: Crashes by Reported PCF and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Notes: PCFs constituting <1% excluded from chart to enhance legibility. Those PCFs include other equipment, hazardous parking, impeding traffic, lights, and brakes.
"Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

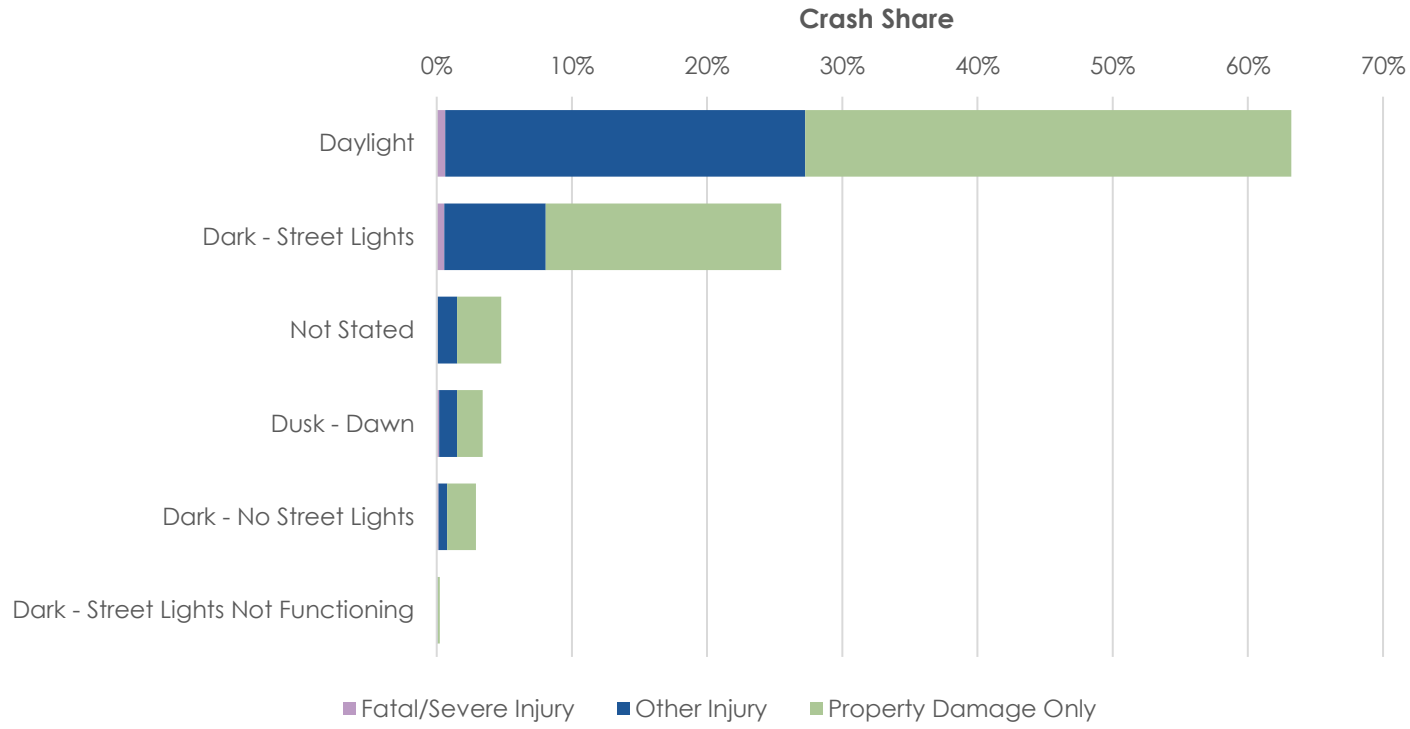
[2] Reported PCF based on CVC violation indicating unsafe speeding on a highway.
[3] Reported PCF based on CVC violation indicating a failure while turning from a direct course without reasonable safety or not signaling appropriately.
[4] Reported PCF based on CVC violation indicating a driver turning failed to yield right-of-way to oncoming traffic.
[5] Reported PCF based on CVC violation indicating a pedestrian failure to yield the right of way to other vehicles.
[6] Reported PCF based on CVC violation indicating driver was under the influence of alcohol.

LIGHTING

Figure 7 shows citywide crashes by reported lighting condition and severity.

- Crashes that occurred in dark conditions (i.e., the three coded categories that indicate "dark" conditions) make up 29 percent of total reported crashes but account for 45 percent of fatal and severe injury crashes.
- 26 fatal crashes occurred in dark conditions, of which six occurred where there were either no streetlights or streetlights were reported as not functioning.

Figure 7: Crash by Lighting and Severity

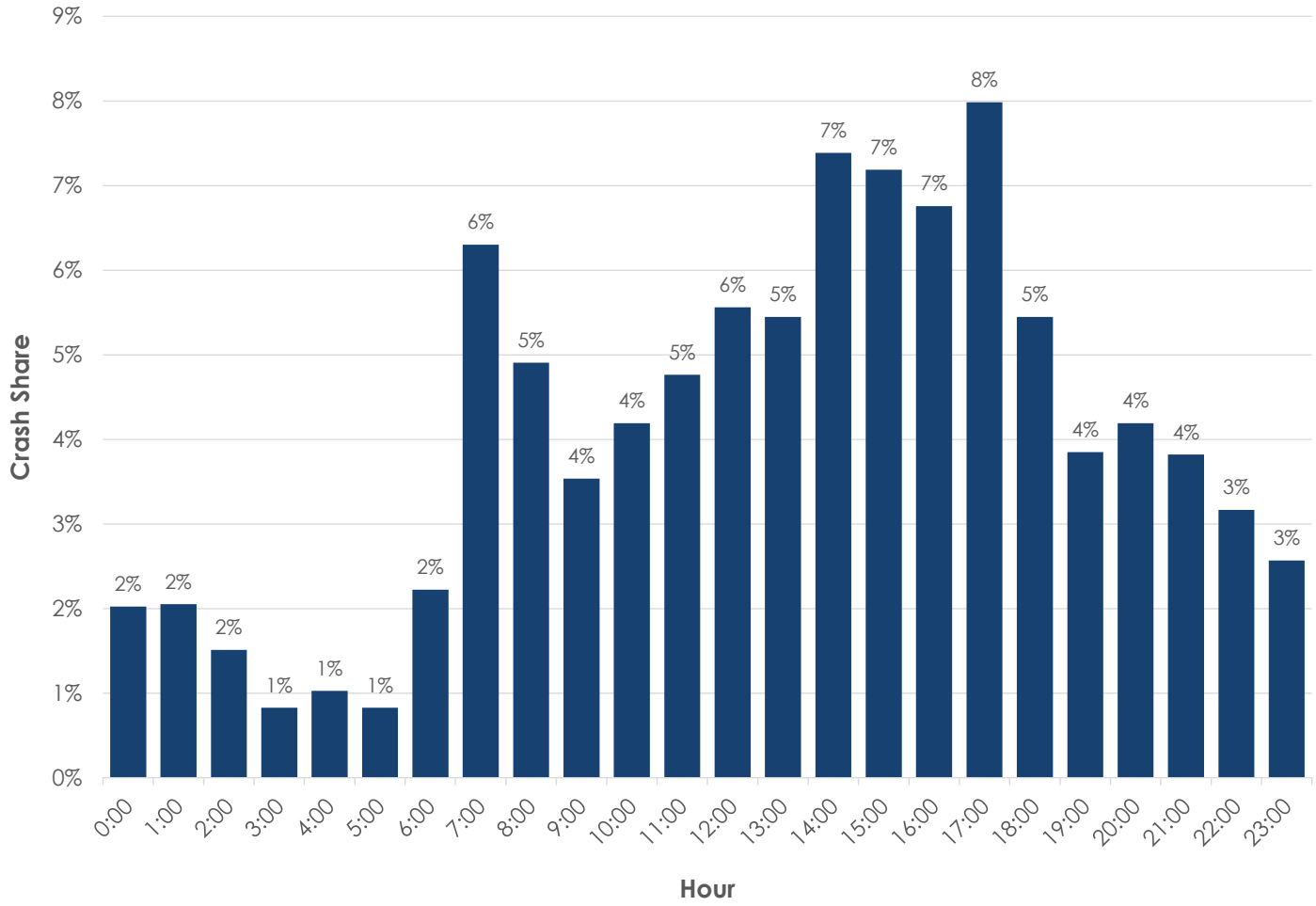


Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes.

TIME OF DAY

Figure 8 shows crashes by time of day. The morning hour from 7 AM to 8 AM and afternoon hours from 2 PM to 6 PM show the greatest frequency of crashes.

Figure 8: Crash Share by Time of Day



Source: SWITRS, TIMS, Kittelson, 2021.
Note: 2% of crashes did not have a time of day reported.

Pedestrians

This section focuses exclusively on reported crashes involving pedestrians. Table 3 shows the distribution of pedestrian crashes by severity. Of the 90 reported pedestrian crashes in Clovis, 16 percent resulted in death or severe injury. This share is more than eight times higher than the same share of total reported crashes (3 percent).

Table 3: Pedestrian Involved Crash by Severity

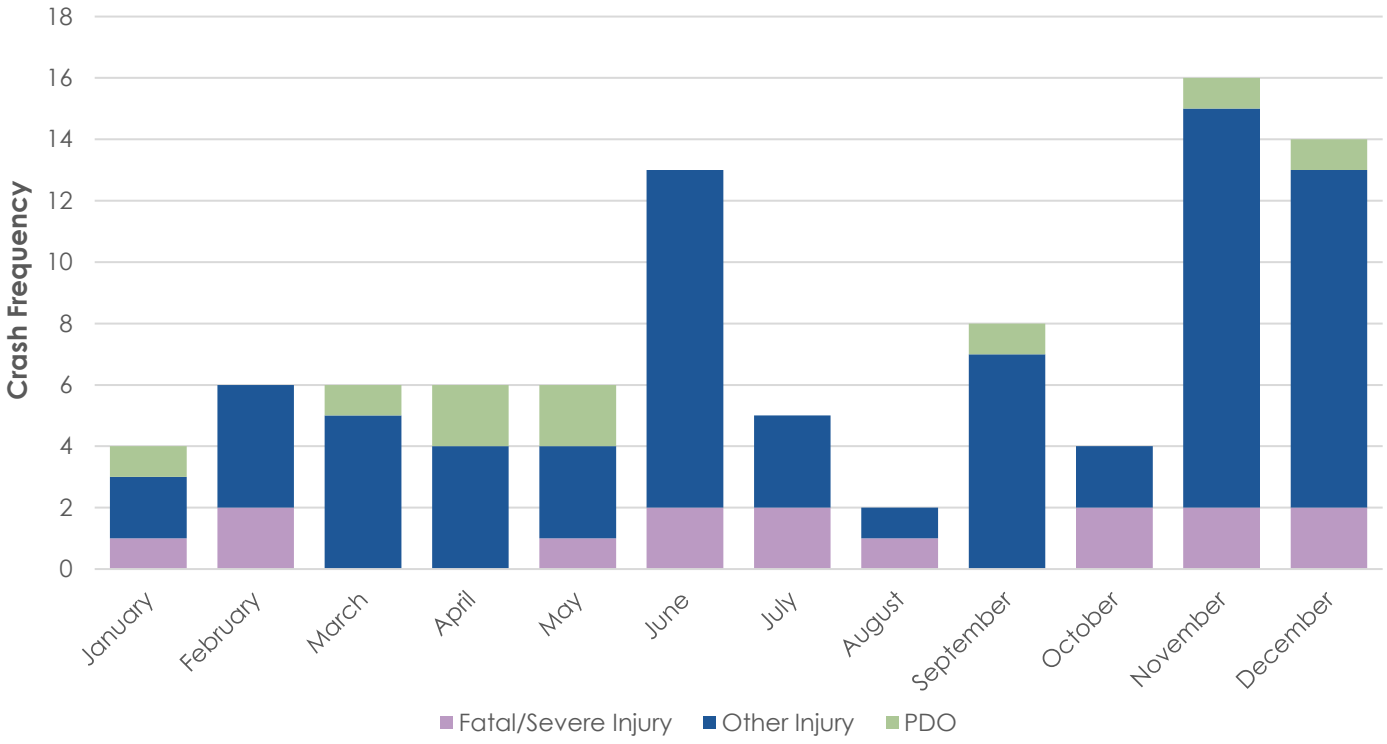
	Fatal (%)	Severe Injury (%)	Visible Injury (%)	Complaint of Pain (%)	Property Damage Only (%)	Total (%)
Pedestrian Involved	4 (4%)	11 (12%)	25 (28%)	41 (46%)	9 (10%)	90 (100%)

Source: SWITRS, TIMS, Kittelson, 2021.

SEVERITY AND MONTH

Figure 9 presents pedestrian crashes organized by month and severity. The highest number of monthly pedestrian crashes occurred in November, December, and June.

Figure 9: Pedestrian Crashes by Month and Severity



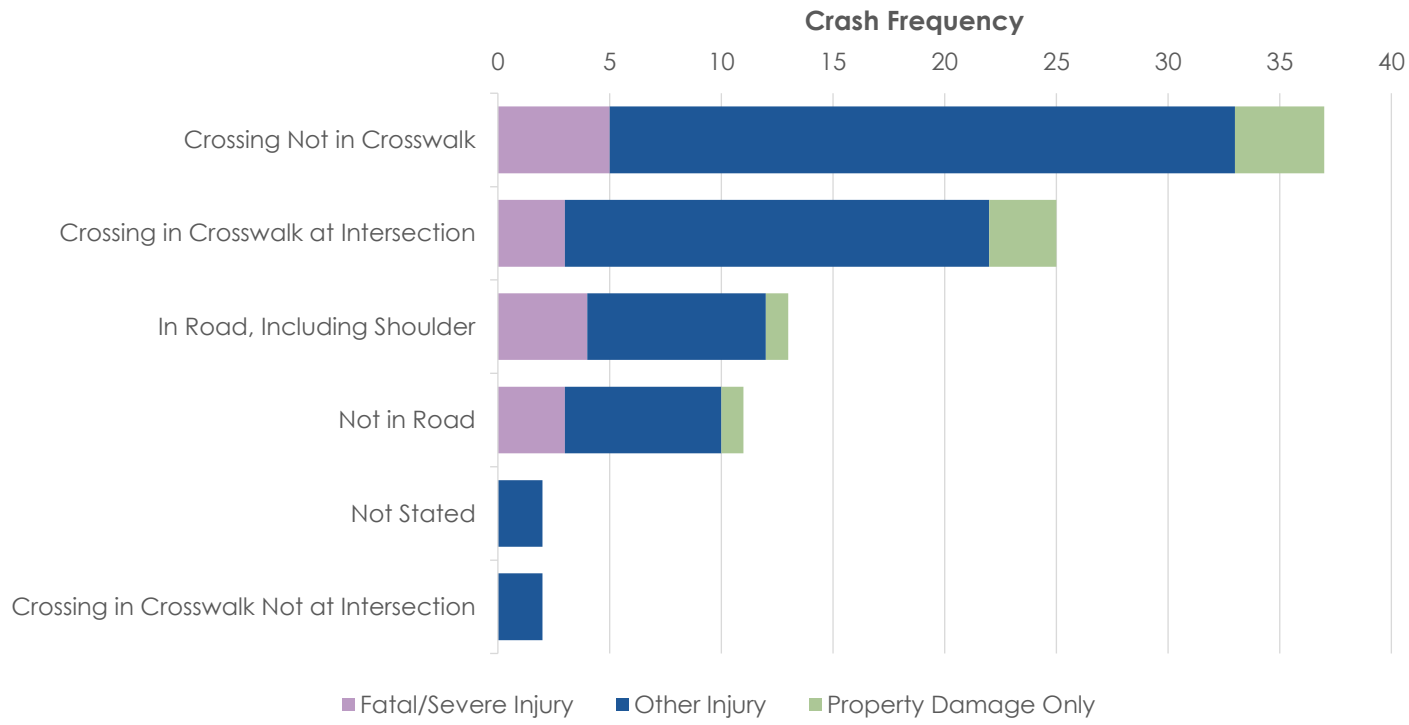
Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

PEDESTRIAN ACTION AND LOCATION

For pedestrian crashes, data are recorded that indicate the reporting officer's best judgment about the person's action and location preceding the crash. Figure 10 reports these trends in the City.

- The three most common pedestrian actions preceding a crash included crossing outside of a crosswalk (41 percent), crossing in a crosswalk at an intersection (28 percent), and walking in the road along the roadway, including shoulder (14 percent).
- 33 percent of the 15 fatal/severe injury pedestrian crashes occurred while a pedestrian was crossing a roadway outside a crosswalk.

Figure 10: Pedestrian Crashes by Reported Action/Location and Severity

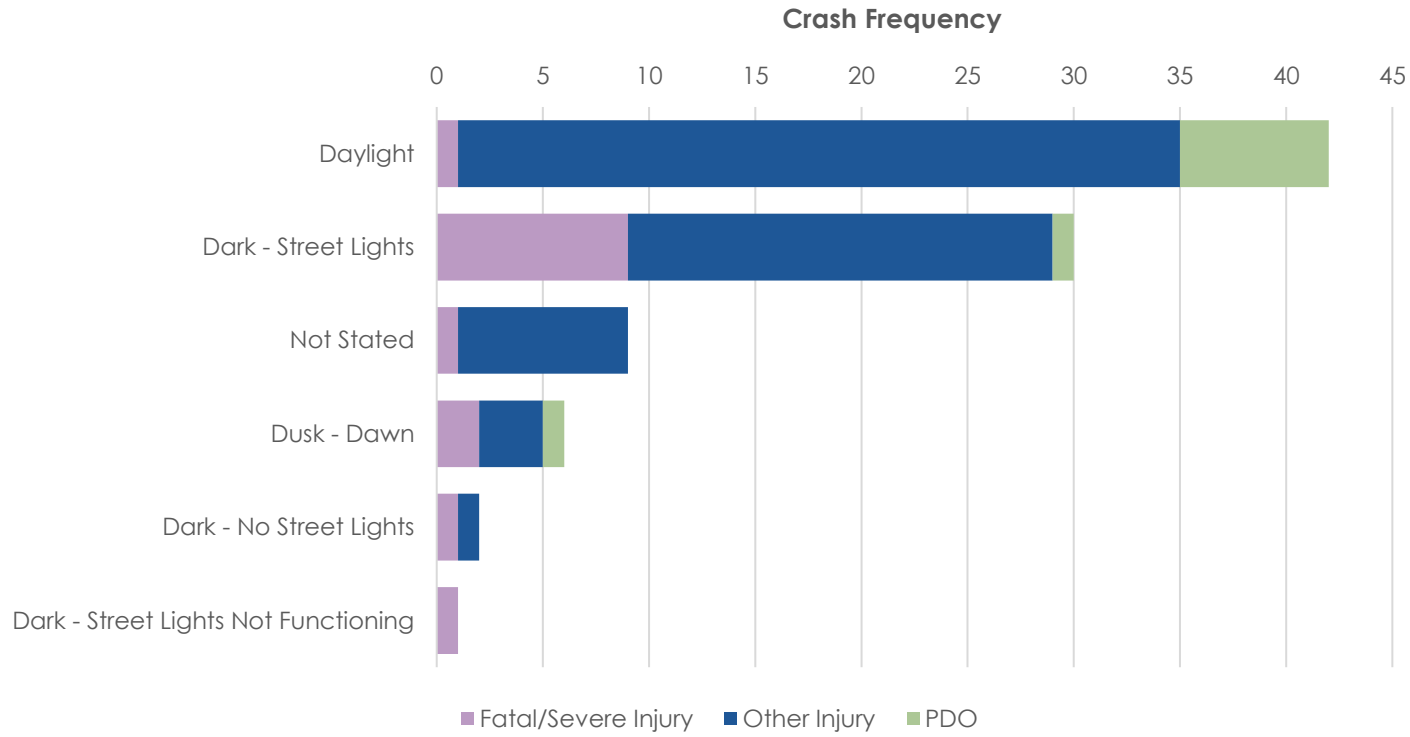


Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

LIGHTING

Figure 11 shows citywide pedestrian crashes by reported lighting condition and severity. Crashes that occurred during dark or dusk/dawn conditions had a higher proportion of fatal/severe injury crashes compared to crashes during daylight conditions.

Figure 11: Pedestrian Crashes by Lighting and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

Bicyclists

This section focuses exclusively on reported crashes involving bicyclists. Table 4 presents bicyclist-involved crashes citywide organized by severity level. Of the reported 118 bicyclist crashes in the City, 4 percent resulted in death or severe injury. The majority resulted in some degree of injury.

Table 4: Bicycle User Involved Crashes by Severity

	Fatal (%)	Severe Injury (%)	Visible Injury (%)	Complaint of Pain (%)	Property Damage Only (%)	Total (%)
Bicycle Involved	1 (1%)	4 (3%)	31 (26%)	59 (50%)	23 (19%)	118 (100%)

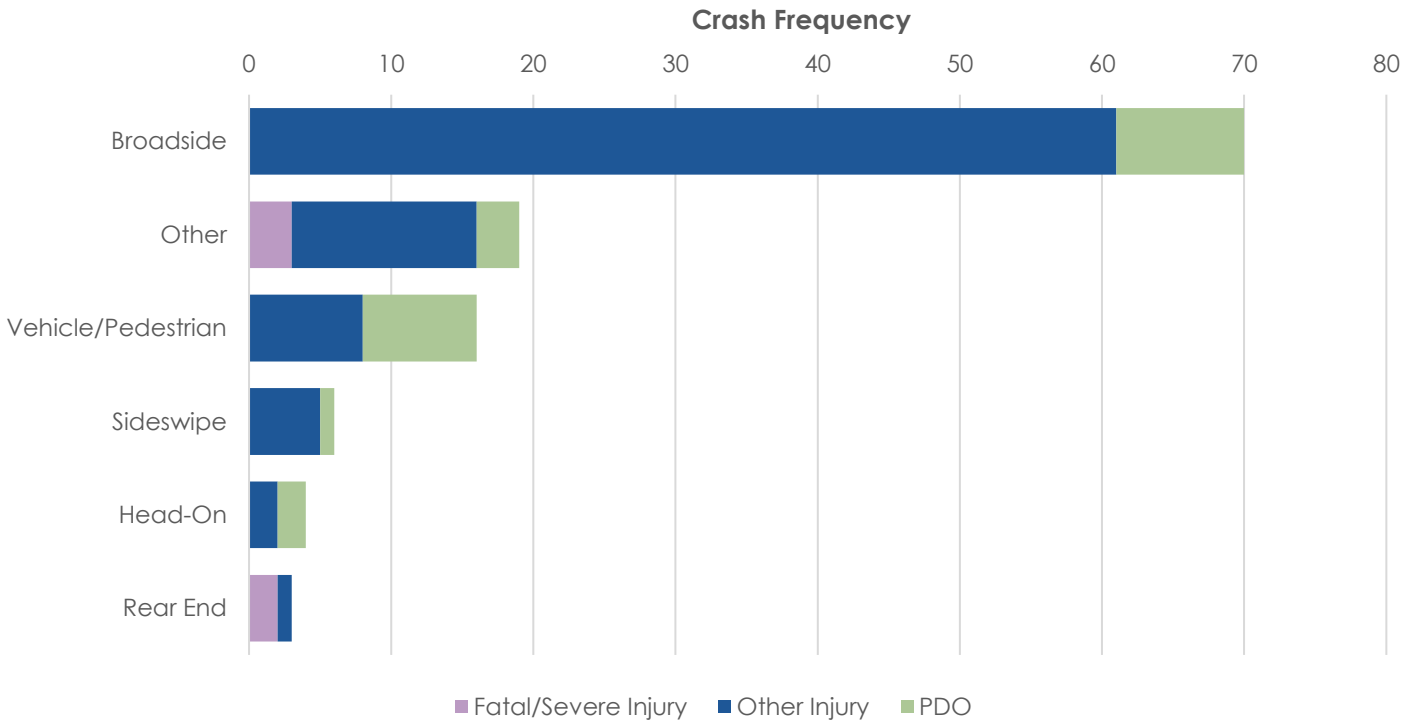
Source: SWITRS, TIMS, Kittelson, 2021.

COLLISION TYPE

Figure 12 presents reported bicycle crashes, organized by collision type.

- The top three collision types among bicyclist crashes include **broadside** (59 percent), **other** (16 percent), and **vehicle/pedestrian crashes** (14 percent).
- While some bicycle-involved crashes likely do include pedestrians, the relatively high share of crashes coded as "other" or "vehicle/pedestrian" could indicate a lack of precision in crash reporting for bicycle crashes.

Figure 12: Bicycle Crashes by Collision Type and Severity



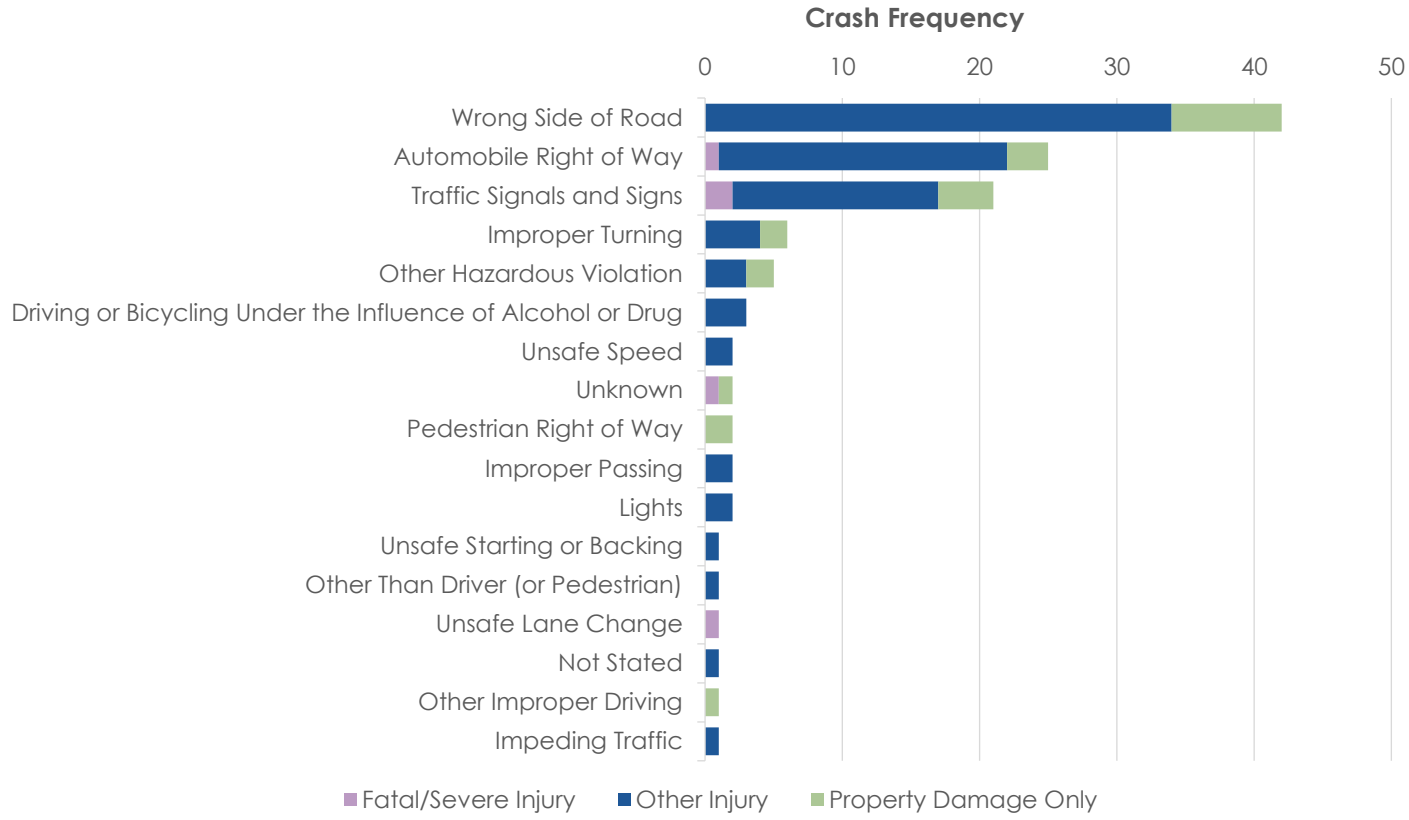
Source: SWITRS, TIMS, Kittelson, 2021.
Notes: Low-frequency collision types excluded from chart to enhance legibility. Those types include: hit object, not stated, or overturned. "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

PRIMARY COLLISION FACTOR (PCF)

Figure 13 presents the reported PCF among bicycle crashes.

- The most frequently cited PCF was **wrong side of road driving/riding**[7] (36 percent). Information on whether these crashes indicate drivers or bicyclists were traveling on the wrong side of the road is not available. However, from anecdotal information, it is somewhat common for bicyclists to ride in the opposite direction from traffic along a shoulder or sidewalk depending on their options for crossing a street to access adjacent land uses.
- The other two most frequent PCFs among bicycle crashes include **automobile right of way**[8] (21 percent) and **traffic signals and signs**[9] (18 percent)

Figure 13: Bicycle Crashes by Primary Collision Factor and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Notes: Low-frequency PCFs excluded from chart to enhance legibility. Those PCFs include: hazardous parking, brakes, pedestrian violation, pedestrian or "other" under the influence of alcohol or drugs, following too closely, other equipment, and fell asleep.
"Other injury" includes "Other visible injury" and "Complaint of pain" crashes.

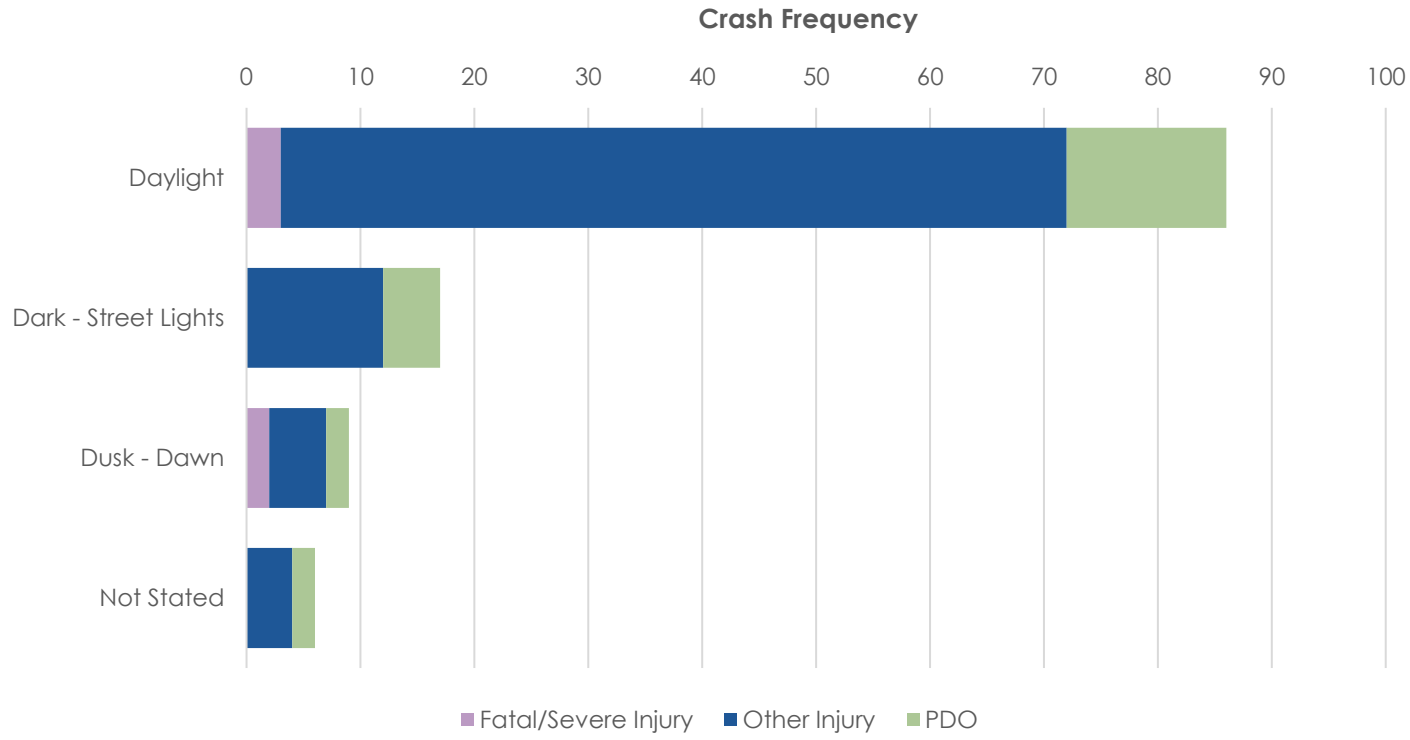
[7] Reported PCF based on CVC violation indicating the driver/rider was on the wrong side of the road.
[8] Reported PCF based on CVC violation indicating a driver turning failed to yield right-of-way to oncoming traffic.
[9] Reported PCF based on CVC violation indicating running a red light or failure to stop at a stop sign.

LIGHTING

Figure 14 presents bicycle crashes organized by lighting and severity. As shown:

- Most bicycle crashes (73 percent) occurred in daylight conditions.
- Bicycle crashes occurring in dusk/dawn conditions account for 8 percent of reported bicyclist crashes but account for two of the five fatal/severe injury crashes.

Figure 14: Bicycle Crashes by Lighting and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

Priority Locations

Kittelson identified priority intersections and segments in Clovis using the annualized crash severity scores and excess predicted crashes described in the Data Summary and Analysis Approach sections (see the Introduction).

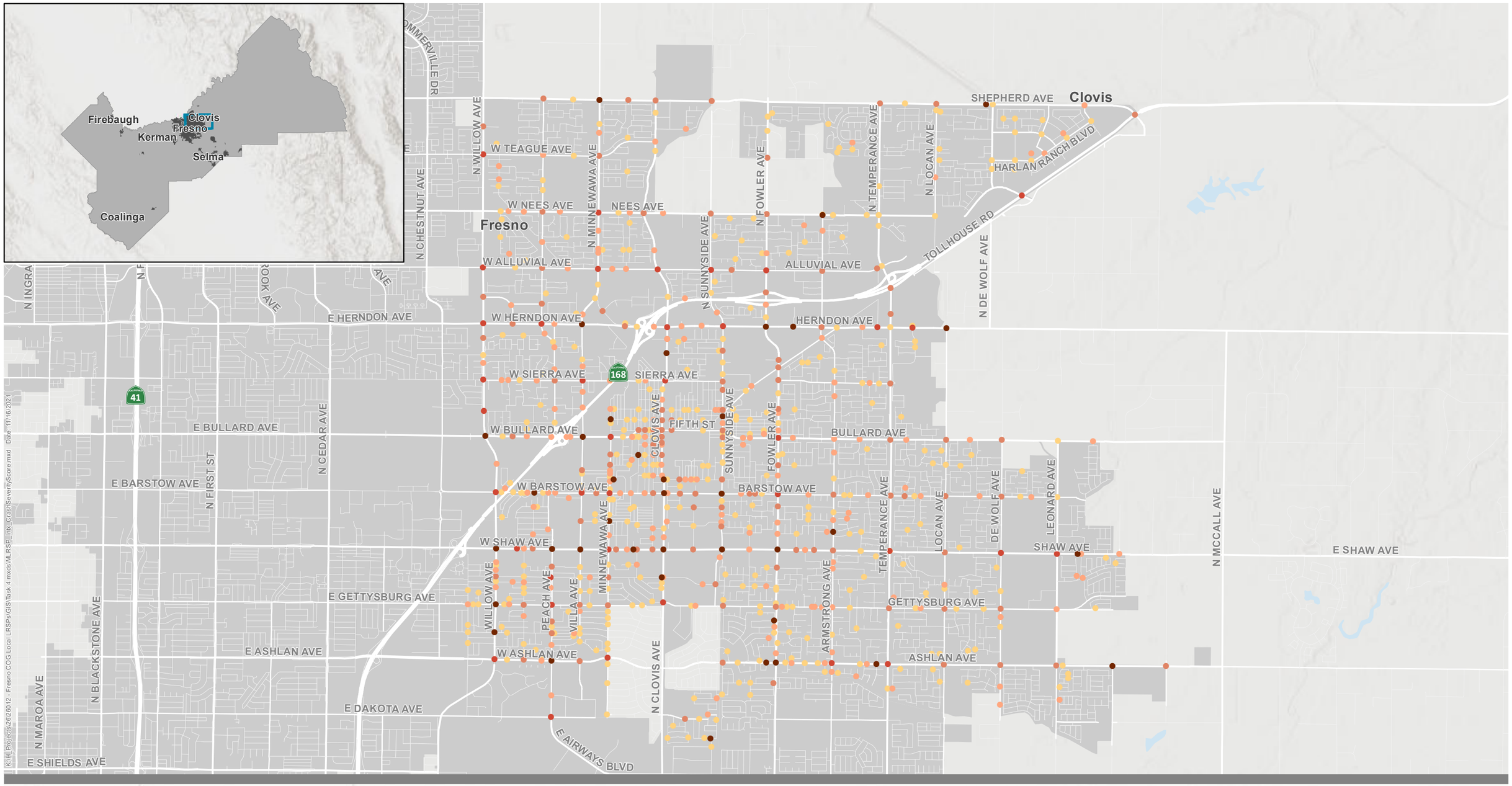
For intersection locations, the crash severity scores ranged from zero (no reported crashes during the five years) to 90.35. Figure 15 shows the results of the intersection crash severity scoring. Figure 16 shows excess predicted crash scores by percentiles for intersection locations. For the half-mile roadway segments, the crash severity scores ranged from zero to 33.13. Crash severity score results for roadway segments are shown in Figure 17. Excess predicted crash score results are shown in Figure 18. Intersections or segments shown as not falling within one of the percentile breaks indicates there were no reported crashes at that location.

Table 5 presents the top twenty locations based on the highest crash severity scores.

Table 5. Top 20 Locations based on Crash Severity Score

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Severity				
					Fatal	Severe Injury	Other Visible Injury	Complaint of Pain	PDO
1	CLOVIS AVE & SANTA ANA AVE	Signalized	90.35	28	0	2	1	7	18
2	WILLOW AVE & SHAW AVE	Signal	85.66	94	0	1	6	31	56
3	FOWLER AVE & SHAW AVE	Signal	74.88	38	0	2	5	10	21
4	HERNDON AVE & FOWLER AVE	Signal	73.39	49	0	2	1	14	32
5	ASHLAN AVE & FOWLER AVE	Signal	68.03	37	0	2	0	13	22
6	CLOVIS AVE & BARSTOW AVE	Signal	64.63	26	0	2	2	8	14
7	BARSTOW AVE & SUNNYSIDE AVE	Signal	59.06	18	0	2	1	6	9
8	VILLA AVE & SHAW AVE	Signal	57.93	51	0	1	4	16	30
9	PEACH AVE & SHAW AVE	Signal	51.27	38	0	1	4	12	21
10	WILLOW AVE & BULLARD AVE	Signal	48.39	43	0	1	2	12	28
11	BULLARD AVE & VILLA AVE	Signal	48.11	37	1	0	3	11	22
12	MINNEWAWA AVE & SHEPHERD AVE	Signal	47.99	35	1	0	0	17	17
13	SAN JOSE AVE & MINNEWAWA AVE	Unsignalized	44.03	6	0	1	1	3	1
14	LOCAN AVE & HERNDON AVE	Unsignalized	44.02	11	0	1	1	2	7
15	HOLLAND AVE & WILLOW AVE	Unsignalized	43.62	9	0	1	1	2	5
16	CLOVIS AVE & PALO ALTO AVE	Unsignalized	42.82	5	0	1	1	2	1
17	SUNNYSIDE AVE & FOURTH ST & GIBSON AVE	Unsignalized	41.68	9	1	0	0	2	6
18	SIERRA VISTA PKWY & SUNNYSIDE AVE & SHAW AVE	Signal	41.68	43	0	0	5	23	15
19	ASHLAN AVE & HIGHLAND AVE	Unsignalized	41.60	4	1	0	1	1	1
20	ASHLAN AVE & PEACH AVE	Signal	41.00	31	0	1	1	9	20

Note: PDO = Property Damage Only



Crash Severity Score

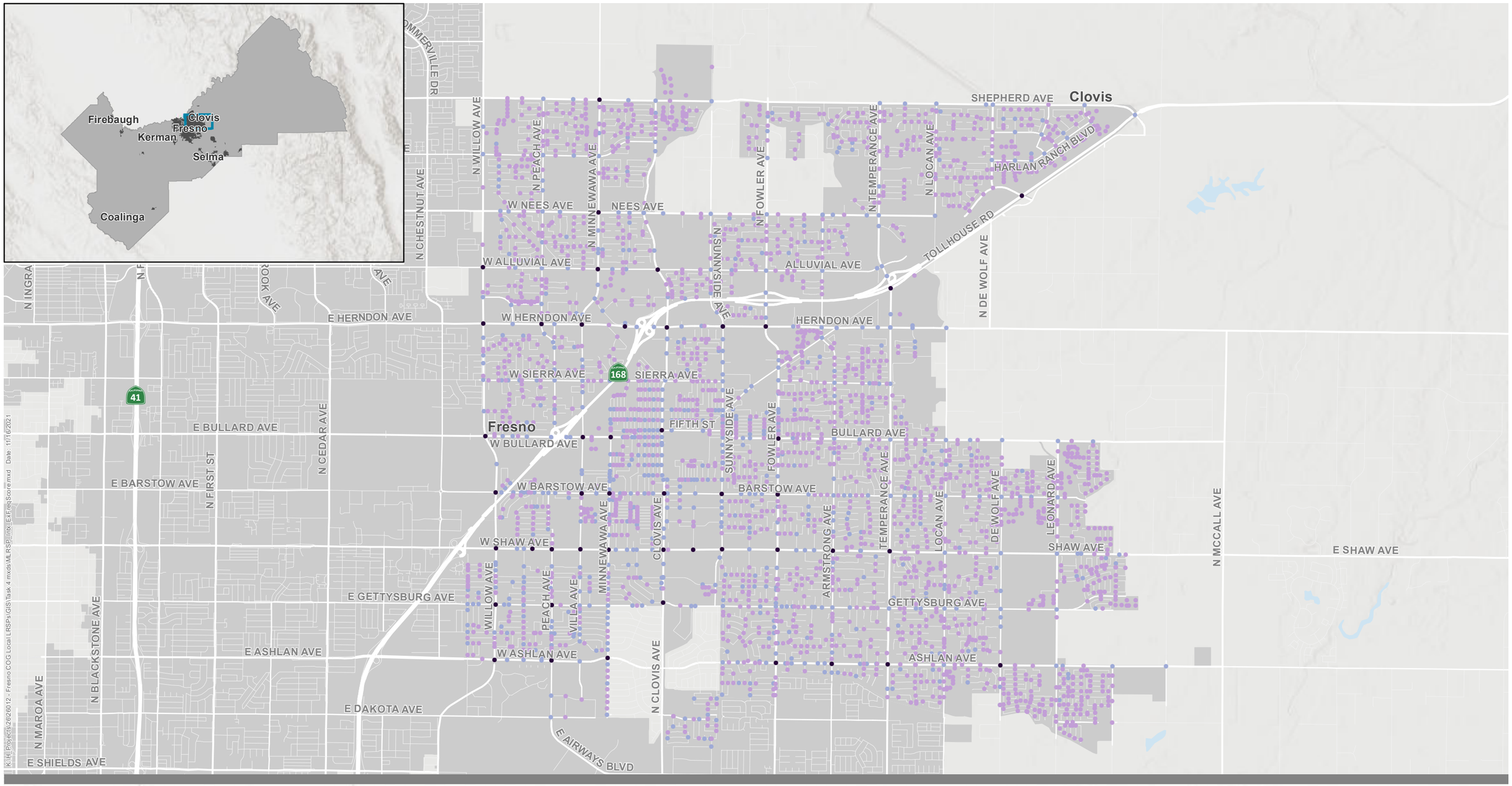
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 0.9 Miles

Figure 15

Intersection Crash Severity Scores
Jurisdiction Results: Clovis
Fresno Council of Governments

KITTELSON & ASSOCIATES



Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile

City Limits

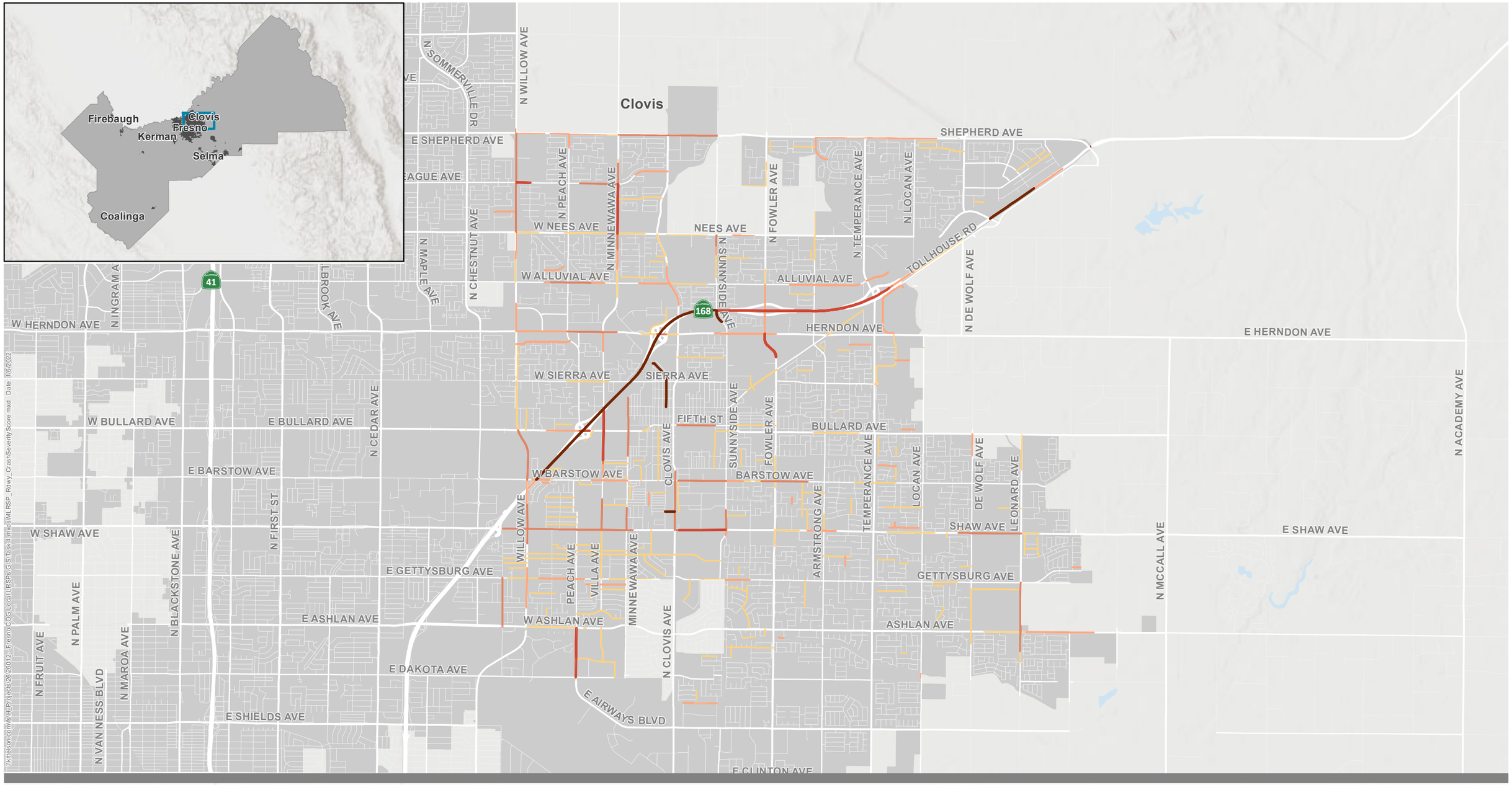
County Boundary

0 0.9 Miles

Figure 16

Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Clovis
Fresno Council of Governments

KITTELSON & ASSOCIATES



Crash Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

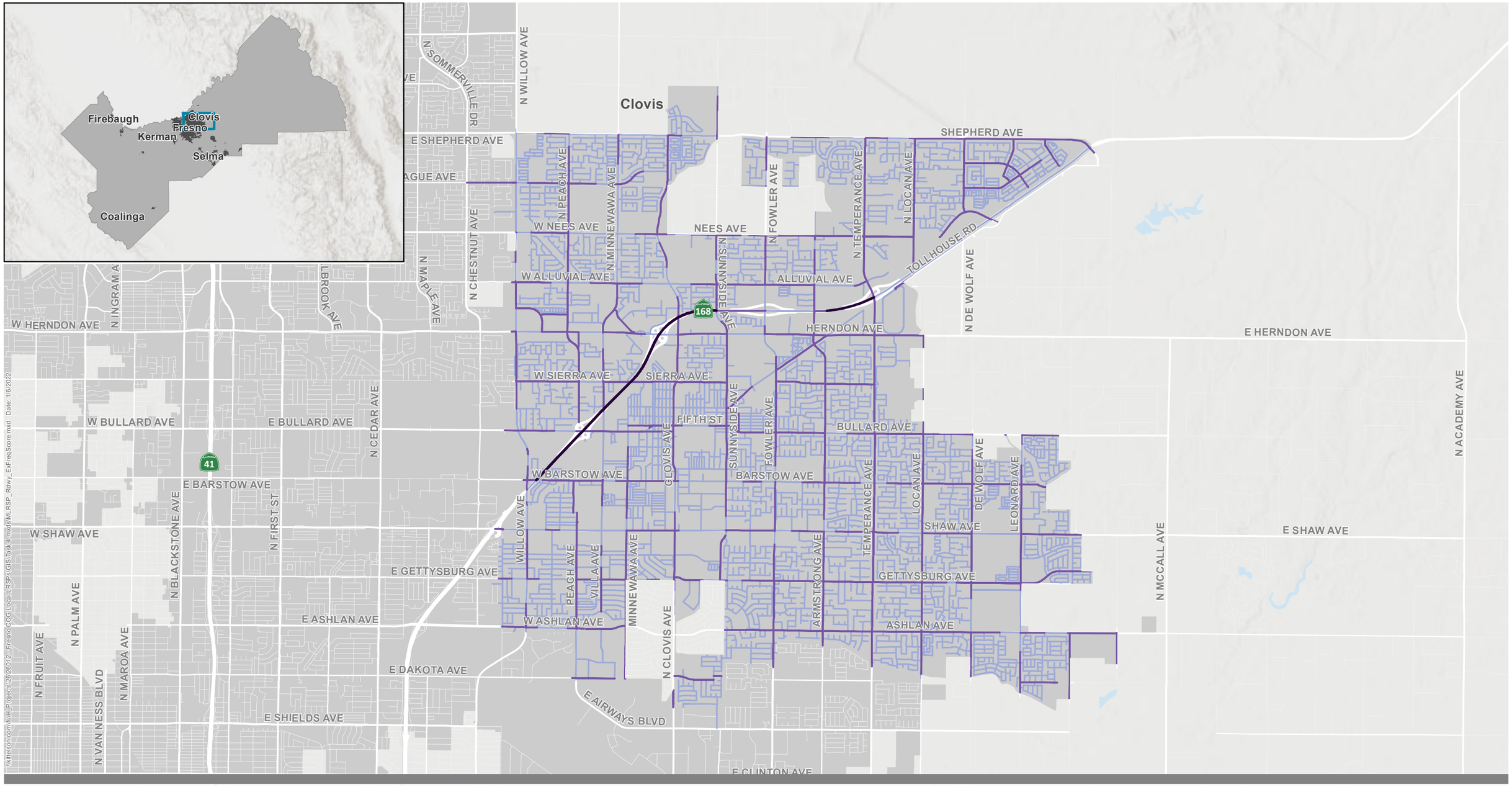
0 0.9 Miles

Roadway segments shown along SR-168 are an at-grade Caltrans facility

KITTELSON & ASSOCIATES

Figure 17

Roadway Crash Severity Scores Jurisdiction Results: Clovis Fresno Council of Governments



Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 0.9 Miles

Roadway segments shown along SR-168 are an at-grade Caltrans facility

Figure 18

Roadway Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Clovis
Fresno Council of Governments

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EMPHASIS AREAS

Based on key trends in the crash data, emphasis areas for the City of Clovis include pedestrian and bicycle crashes, broadside crashes, and hit object crashes. Due to the prevalence of collision factors citing unsafe speed and driving under the influence, the City may also choose to focus on education and enforcement strategies aimed at encouraging safe driver behaviors. Each of these areas is further discussed below.

Pedestrian and Bicycle Crashes

Pedestrian and bicycle crashes were identified as a focus area given the overrepresentation of pedestrians and bicyclists in fatal and severe crashes. Half of the ten fatal crashes involved a pedestrian or bicyclist and a third of the severe crashes involved a pedestrian or bicyclist. The most common pedestrian action preceding a crash was crossing the roadway outside a crosswalk, followed by crossing the roadway at an intersection crosswalk. The most frequently cited primary collision factor in bicycle crashes was wrong side of road driving/riding, which could indicate bicyclists riding in the opposite direction from traffic along a shoulder or sidewalk depending on their options for crossing a street to access adjacent land uses. These pedestrian actions and bicyclist behaviors suggest opportunities for improvements to pedestrian and bicycle infrastructure, as well as education for drivers, pedestrians, and bicyclists on rules of the road.

Pedestrians and bicyclists are identified as two of the six high priority challenge areas in the California SHSP. These challenge areas "were identified through historical data evaluations and feedback from traffic safety stakeholders across the state" (Caltrans SHSP). The high priorities represent "the greatest opportunity to reduce fatalities and serious injuries across the state" (Caltrans SHSP).

Broadside Crashes

A broadside crash occurs when the front of one vehicle hits the side of another vehicle. Broadside crashes were selected as an emphasis area due to the frequency and severity of these collision types. Broadside crashes were the second most frequent collision type and represent 23 percent of fatal and severe injury crashes. As discussed below under Engineering Strategies, countermeasures are available targeted at broadside crashes.

Hit Object Crashes

Hit object crashes were selected as an emphasis area due to their frequency in fatal crashes. They are the third most common collision type and comprise four of the ten fatal crashes and six of the 46 severe injury crashes. A variety of roadway countermeasures are available targeted at slowing traffic speeds, improving roadside conditions, and reducing hit object crashes.

The California SHSP includes lane departures as one of the six high priorities in California. As indicated in the Caltrans SHSP, "the Lane Departures Challenge Area includes head-on, hit object, and overturned crashes. This includes instances where a vehicle runs off the road or crosses into the opposing lane prior to the collision." These crashes are a high priority due to their severity level.

Unsafe Speed and Driving Under the Influence

Unsafe speed is the most frequently reported PCF among all reported crashes and the third most frequent in fatal/severe injury crashes. Driving or bicycling under the influence of alcohol and drugs is the third most common PCF cited in fatal/severe injury crashes. This suggests there are opportunities to address driver behavior through countermeasures that encourage lower speeds and education and enforcement.

The California SHSP identified impaired driving and speed management/aggressive driving as two of the six high priorities in California, reflecting the potential to reduce fatalities and serious injuries by addressing these challenge areas.

STRATEGIES

The following subsections present engineering, education, emergency services, and enforcement strategies to help improve roadway safety within the City of Clovis.

Engineering Strategies

The top three fatal and severe injury collision types in Clovis were **broadside**, **vehicle-pedestrian**, and **hit object** crashes; the top three fatal and severe injury primary collision factors were **pedestrian violation**, **driving under the influence**, and **unsafe speed**. High priority countermeasures to address these collision types and primary collision factors are shown in Table 6.

Table 6. High Priority Countermeasures

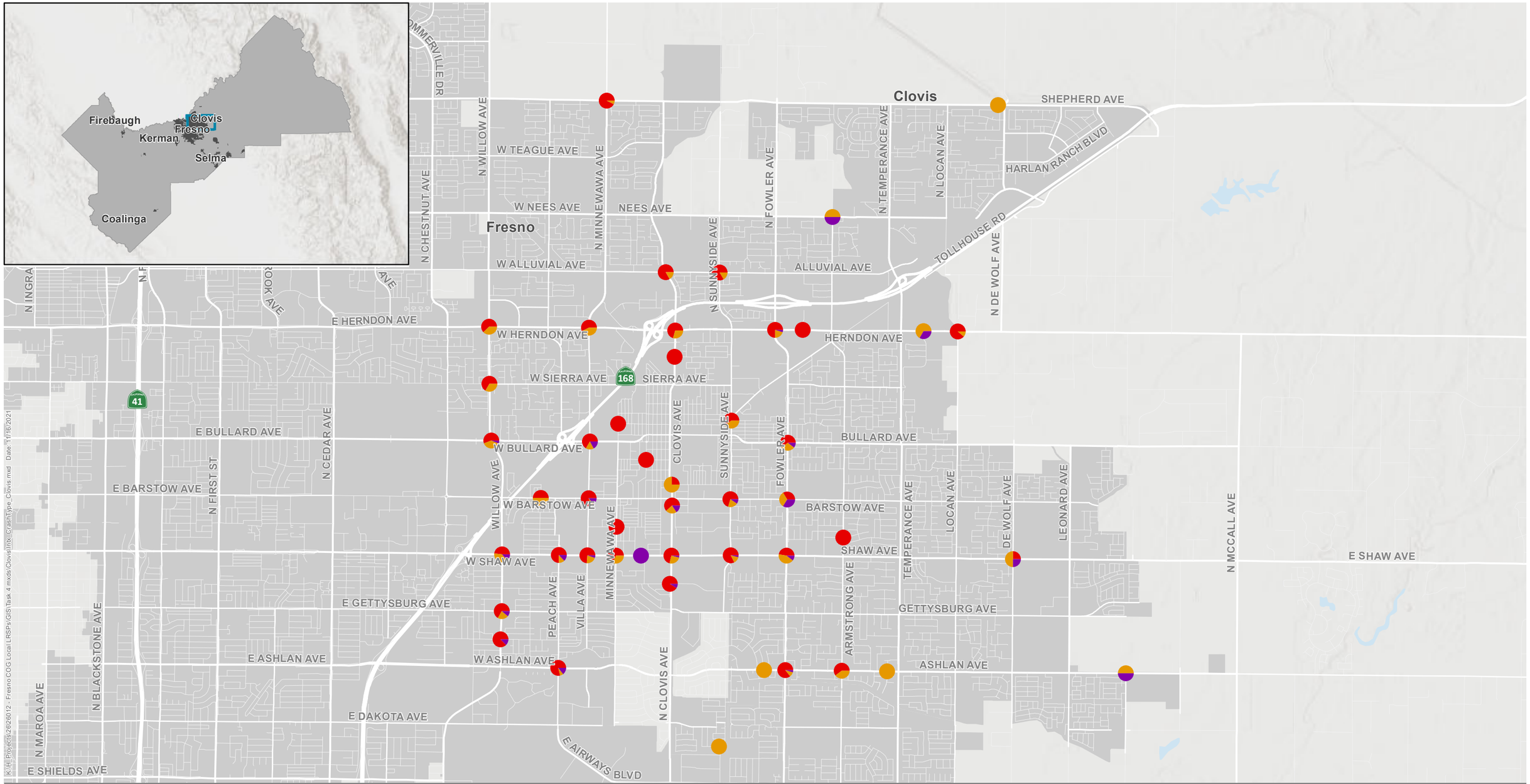
	Countermeasure Name	ID	Crashes Addressed
Roadway Countermeasures	Street Lighting	R01	Crashes at night
	Road Diet	R14	Hit object, unsafe speed
	Improve Pavement Friction (High Friction Surface Treatment)	R21	Hit object, unsafe speed
	Install/Upgrade Signs with New Fluorescent Sheeting	R22	Hit object, unsafe speed
	Install Dynamic/Variable Speed Warning Sings	R26	Hit object, unsafe speed
Intersection Countermeasures	Add Intersection Lighting at Intersections	S1/NS1	Crashes at night
	Improve Signal Hardware: Lenses, Backplates with Retroreflective Border, Mounting Size, Number	S2	Broadside
	Install Flashing Beacons as Advance Warning	S10/NS9	Unsafe speed
	Convert Intersection to Roundabout	NS4/NS5	Broadside, unsafe speed
	Install/Upgrade Stop Signs or Intersection Warning/ Regulatory Signs	NS6	Broadside
	Upgrade Intersection Pavement Markings	NS7	Broadside
	Install Splitter Islands for Minor Street Approaches	NS13	Broadside
Pedestrian/Bicycle Countermeasures	Install Bike Lanes	R32PB	Overrepresented bicycle crashes
	Install Sidewalk/Pathway	R34PB	Pedestrian violation
	Install/Upgrade Pedestrian Crossing with Enhanced Features	R35PB	Vehicle-pedestrian, pedestrian violation
	Install Pedestrian Countdown Signal Heads	S17PB	Pedestrian violation
	Install Pedestrian Crossing	S18PB/NS20PB	Vehicle-pedestrian
	Install Raised Medians (or Refuge Islands)	NS19PB	Vehicle-pedestrian, pedestrian violation
	Bike Lane Extension Through Intersections	n/a	Overrepresented bicycle crashes
	Bike Boxes	n/a	Overrepresented bicycle crashes

Note: The ID number references the Caltrans Manual Local Road Safety

Appendix B contains the regional Countermeasures Toolbox which includes more detailed information regarding the countermeasures listed above.

The following figures and tables provide data on collision types and factors for the intersections and roadways with the highest crash scores. The locations with the highest crash scores may be top priorities for implementing countermeasures and pursuing grants. Clovis can use the information about collision type and factors to identify potential countermeasures to apply, using the information in Table 6.

Figure 19 and Figure 20 present the top priority intersections and breakdown of the top collision types and primary collision factors, respectively. Figure 21 and Figure 22 present the top priority roadways and breakdown of the top collision types and primary collision factors, respectively.



Collision Type

- Broadside
- Vehicle/Pedestrian
- Hit Object

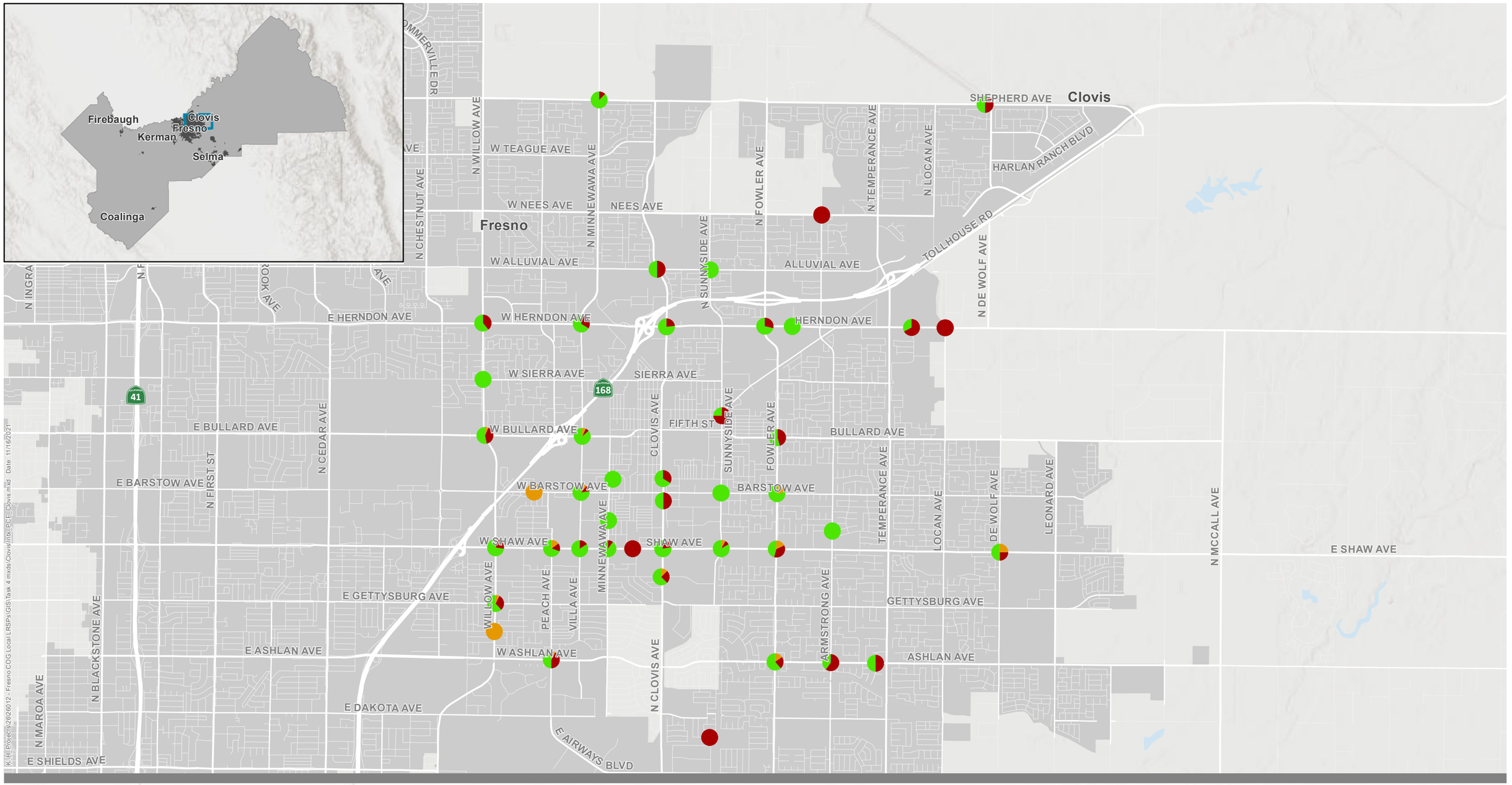
- City Limits
- County Boundary

0 0.9 Miles

Figure 19

Top Fatal/Severe Injury Intersection Collision Types
Jurisdiction Results: Clovis
Fresno Council of Governments

KITTELSON & ASSOCIATES



Primary Collision Factors

- Unsafe Speed
- Driving Under the Influence
- Pedestrian Violation

City Limits

County Boundary

0 0.9 Miles

Figure 20

Top Fatal/Severe Injury Intersection Primary Collision Factors
Jurisdiction Results: Clovis
Fresno Council of Governments

KITTELSON & ASSOCIATES

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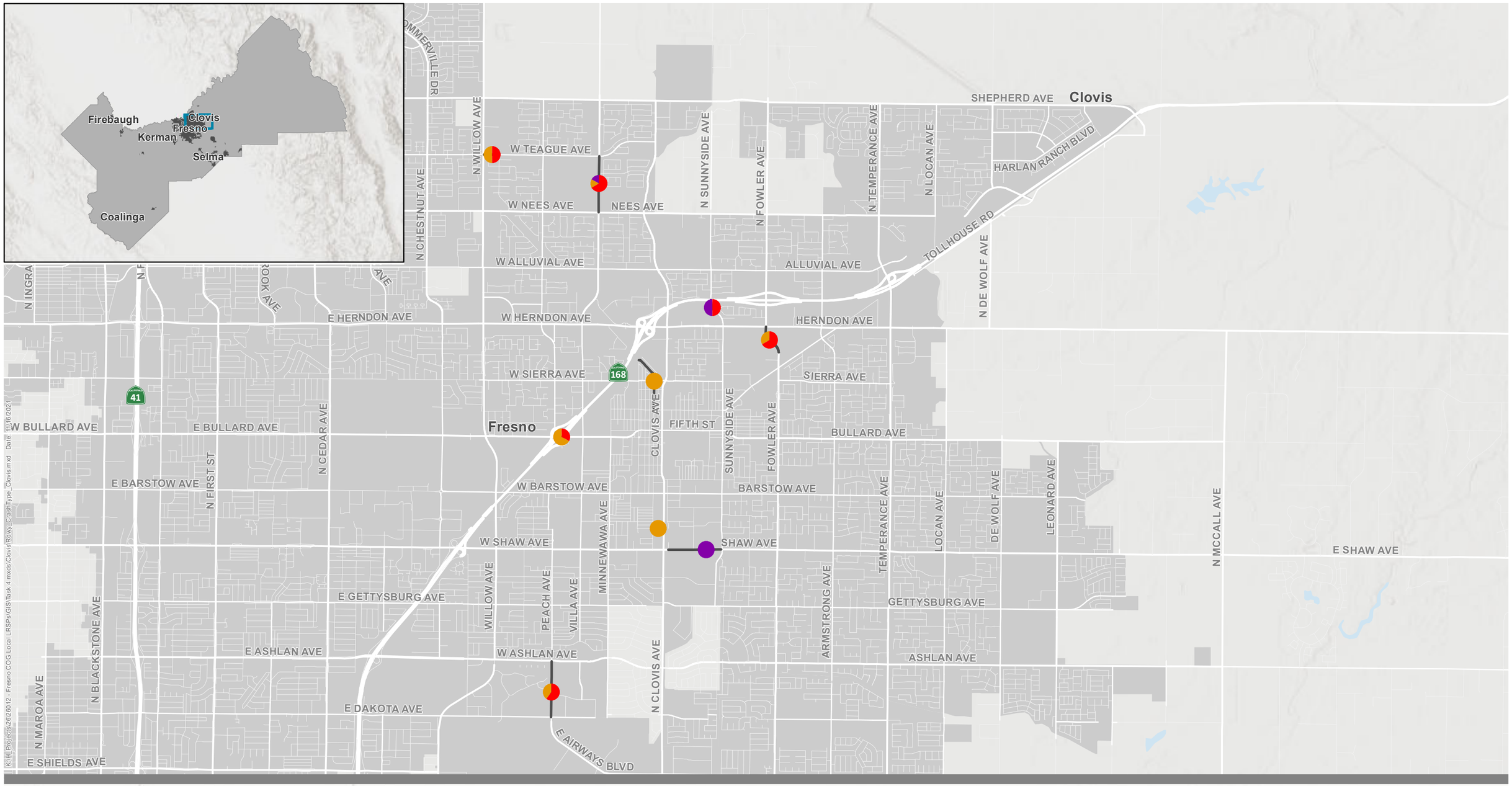


Collision Type

- Broadside
- Vehicle/Pedestrian
- Hit Object
- Priority Roadways
- City Limits
- County Boundary

KITTELSON & ASSOCIATES

Note: Priority locations on state facilities have been excluded.

Figure 21

Top Fatal/Severe Injury Roadway Collision Types
Jurisdiction Results: Clovis
Fresno Council of Governments

Primary Collision Factors

- Unsafe Speed
- Driving Under the Influence
- Pedestrian Violation
- Priority Roadways

City Limits

County Boundary

0 0.9 Miles

KITTELSON & ASSOCIATES

Note: Priority locations on state facilities have been excluded.

Figure 22

Top Fatal/Severe Injury Roadway Primary Collision Factors
Jurisdiction Results: Clovis
Fresno Council of Governments

Table 7 and Table 8 provide information for the top fifty intersection locations (based on crash severity score), including control type (signalized or unsignalized), crash severity score, and total number of crashes by collision type or primary collision factor.

Table 7. Priority Intersections with Collision Type based on Top 3 Fatal/Severe Injury Collision Types

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Collision Type			
					Broadside	Vehicle / Ped	Hit Object	Other
1	CLOVIS AVE & SANTA ANA AVE	Signal	90.35	28	11	0	1	16
2	WILLOW AVE & SHAW AVE	Signal	85.66	94	14	11	4	65
3	FOWLER AVE & SHAW AVE	Signal	74.88	38	9	8	2	19
4	HERNDON AVE & FOWLER AVE	Signal	73.39	49	15	4	1	29
5	ASHLAN AVE & FOWLER AVE	Signal	68.03	37	18	2	1	16
6	CLOVIS AVE & BARSTOW AVE	Signal	64.63	26	8	3	2	13
7	BARSTOW AVE & SUNNYSIDE AVE	Signal	59.06	18	7	2	1	8
8	VILLA AVE & SHAW AVE	Signal	57.93	51	14	4	1	32
9	PEACH AVE & SHAW AVE	Signal	51.27	38	12	2	2	22
10	WILLOW AVE & BULLARD AVE	Signal	48.39	43	10	7	1	25
11	BULLARD AVE & VILLA AVE	Signal	48.11	37	8	2	2	25
12	MINNEWAWA AVE & SHEPHERD AVE	Signal	47.99	35	24	2	0	9
13	SAN JOSE AVE & MINNEWAWA AVE	Unsignalized	44.03	6	3	0	0	3
14	LOCAN AVE & HERNDON AVE	Unsignalized	44.02	11	8	1	0	2
15	HOLLAND AVE & WILLOW AVE	Unsignalized	43.62	9	7	0	1	1
16	CLOVIS AVE & PALO ALTO AVE	Unsignalized	42.82	5	3	0	0	2
17	SUNNYSIDE AVE & FOURTH ST & GIBSON AVE	Unsignalized	41.68	9	3	2	0	4
18	SIERRA VISTA PKWY & SUNNYSIDE AVE & SHAW AVE	Signal	41.68	43	19	3	1	20
19	ASHLAN AVE & HIGHLAND AVE	Unsignalized	41.60	4	0	1	1	2
20	ASHLAN AVE & PEACH AVE	Signal	41.00	31	11	1	2	17
21	VILLA AVE & HERNDON AVE	Signal	40.80	30	4	3	0	23
22	SHAW AVE & DARTMOUTH AVE	Unsignalized	40.68	4	0	0	1	3
23	ARMSTRONG AVE & KEATS AVE	Unsignalized	40.48	3	2	0	0	1
24	CLOVIS AVE & JEFFERSON AVE	Unsignalized	39.86	5	1	3	0	1
25	BARSTOW AVE & SYLMAR AVE	Unsignalized	39.66	4	1	1	0	2
26	SHAW AVE & CLOVIS AVE	Signal	39.51	52	17	6	1	28
27	ASHLAN AVE & RENN AVE	Unsignalized	39.46	3	0	2	0	1
28	ARMSTRONG AVE & NEES AVE	Unsignalized	39.26	2	0	1	1	0
29	SHEPHERD AVE & DE WOLF AVE	Signal	39.26	2	0	2	0	0
30	ASH AVE & HERNDON AVE	Unsignalized	39.26	2	1	0	0	1
31	GETTYSBURG AVE & WILLOW AVE	Signal	38.78	25	6	2	1	16
32	PISTACHIO AVE & ASHLAN AVE	Unsignalized	38.25	2	0	1	0	1

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Collision Type			
					Broadside	Vehicle / Ped	Hit Object	Other
33	FEDORA AVE & DUKE AVE	Unsignalized	38.25	2	0	1	0	1
34	FOWLER AVE (FRONTAGE) & DONNER AVE	Unsignalized	38.25	2	0	0	0	2
35	EIGHTH ST & DE WITT AVE	Unsignalized	38.05	1	1	0	0	0
36	SHAW AVE & SOLEDAD AVE	Unsignalized	38.05	1	0	0	0	1
37	MINNEWAWA AVE & FOURTH ST	Unsignalized	38.05	1	1	0	0	0
38	CHERRY LN & ALY (B/W MINNEWAWA AVE & 10TH ST)	Unsignalized	38.05	1	0	0	0	1
39	FOWLER AVE & BARSTOW AVE	Signal	35.86	21	2	2	2	15
40	FOWLER AVE & BULLARD AVE	Signal	35.26	18	6	3	1	8
41	CLOVIS AVE & ALLUVIAL AVE	Signal	35.17	12	5	1	0	6
42	HERNDON AVE & CLOVIS AVE	Signal	34.30	56	12	5	0	39
43	ALLUVIAL AVE & SUNNYSIDE AVE	Signal	32.44	9	5	1	0	3
44	BARSTOW AVE & VILLA AVE	Signal	30.61	38	12	1	2	23
45	ASHLAN AVE & ARMSTRONG AVE	Signal	30.38	13	3	2	0	8
46	SHAW AVE & DE WOLF AVE	Signal	29.78	10	1	2	1	6
47	MINNEWAWA AVE & SHAW AVE	Signal	29.68	38	13	6	0	19
48	SIERRA AVE & WILLOW AVE	Signal	29.18	7	2	1	0	4
49	WILLOW AVE & HERNDON AVE	Signal	29.17	41	13	8	0	20
50	MEDICAL CENTER DR & HERNDON AVE & COVENTRY AVE	Signal	27.14	7	0	2	1	4

Note: Other crashes include all crashes that are not coded as one of the top three collision types

Table 8. Priority Intersections with Primary Collision Factor based on Top 3 Fatal/Severe Injury Primary Collision Factors

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Pedestrian Violation	DUI	Unsafe Speed	Other
1	CLOVIS AVE & SANTA ANA AVE	Signal	90.35	28	1	2	5	20
2	WILLOW AVE & SHAW AVE	Signal	85.66	94	3	11	38	42
3	FOWLER AVE & SHAW AVE	Signal	74.88	38	2	4	5	27
4	HERNDON AVE & FOWLER AVE	Signal	73.39	49	0	4	10	35
5	ASHLAN AVE & FOWLER AVE	Signal	68.03	37	2	3	8	24
6	CLOVIS AVE & BARSTOW AVE	Signal	64.63	26	0	3	3	20
7	BARSTOW AVE & SUNNYSIDE AVE	Signal	59.06	18	0	0	3	15
8	VILLA AVE & SHAW AVE	Signal	57.93	51	0	3	16	32
9	PEACH AVE & SHAW AVE	Signal	51.27	38	2	2	9	25
10	WILLOW AVE & BULLARD AVE	Signal	48.39	43	1	6	8	28
11	BULLARD AVE & VILLA AVE	Signal	48.11	37	1	1	13	22
12	MINNEWAWA AVE & SHEPHERD AVE	Signal	47.99	35	0	1	7	27
13	SAN JOSE AVE & MINNEWAWA AVE	Unsignalized	44.03	6	0	0	2	4

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Pedestrian Violation	DUI	Unsafe Speed	Other
14	LOCAN AVE & HERNDON AVE	Unsignalized	44.02	11	0	1	0	10
15	HOLLAND AVE & WILLOW AVE	Unsignalized	43.62	9	1	0	0	8
16	CLOVIS AVE & PALO ALTO AVE	Unsignalized	42.82	5	0	0	0	5
17	SUNNYSIDE AVE & FOURTH ST & GIBSON AVE	Unsignalized	41.68	9	0	3	1	5
18	SIERRA VISTA PKWY & SUNNYSIDE AVE & SHAW AVE	Signal	41.68	43	1	1	10	31
19	ASHLAN AVE & HIGHLAND AVE	Unsignalized	41.60	4	0	0	0	4
20	ASHLAN AVE & PEACH AVE	Signal	41.00	31	1	5	6	19
21	VILLA AVE & HERNDON AVE	Signal	40.80	30	0	5	10	15
22	SHAW AVE & DARTMOUTH AVE	Unsignalized	40.68	4	0	1	0	3
23	ARMSTRONG AVE & KEATS AVE	Unsignalized	40.48	3	0	0	1	2
24	CLOVIS AVE & JEFFERSON AVE	Unsignalized	39.86	5	0	1	2	2
25	BARSTOW AVE & SYLMAR AVE	Unsignalized	39.66	4	1	0	0	3
26	SHAW AVE & CLOVIS AVE	Signal	39.51	52	0	5	18	29
27	ASHLAN AVE & RENN AVE	Unsignalized	39.46	3	0	0	0	3
28	ARMSTRONG AVE & NEES AVE	Unsignalized	39.26	2	0	1	0	1
29	SHEPHERD AVE & DE WOLF AVE	Signal	39.26	2	0	1	1	0
30	ASH AVE & HERNDON AVE	Unsignalized	39.26	2	0	0	1	1
31	GETTYSBURG AVE & WILLOW AVE	Signal	38.78	25	1	4	8	12
32	PISTACHIO AVE & ASHLAN AVE	Unsignalized	38.25	2	0	1	1	0
33	FEDORA AVE & DUKE AVE	Unsignalized	38.25	2	0	1	0	1
34	FOWLER AVE (FRONTAGE) & DONNER AVE	Unsignalized	38.25	2	0	0	0	2
35	EIGHTH ST & DE WITT AVE	Unsignalized	38.05	1	0	0	0	1
36	SHAW AVE & SOLEDAD AVE	Unsignalized	38.05	1	0	0	0	1
37	MINNEWAWA AVE & FOURTH ST	Unsignalized	38.05	1	0	0	0	1
38	CHERRY LN & ALY (B/W MINNEWAWA AVE & 10TH ST)	Unsignalized	38.05	1	0	0	1	0
39	FOWLER AVE & BARSTOW AVE	Signal	35.86	21	2	0	7	12
40	FOWLER AVE & BULLARD AVE	Signal	35.26	18	0	5	6	7
41	CLOVIS AVE & ALLUVIAL AVE	Signal	35.17	12	0	2	2	8
42	HERNDON AVE & CLOVIS AVE	Signal	34.30	56	0	4	13	39
43	ALLUVIAL AVE & SUNNYSIDE AVE	Signal	32.44	9	0	0	2	7
44	BARSTOW AVE & VILLA AVE	Signal	30.61	38	2	2	14	20
45	ASHLAN AVE & ARMSTRONG AVE	Signal	30.38	13	0	3	2	8
46	SHAW AVE & DE WOLF AVE	Signal	29.78	10	1	1	2	6
47	MINNEWAWA AVE & SHAW AVE	Signal	29.68	38	0	1	9	28
48	SIERRA AVE & WILLOW AVE	Signal	29.18	7	0	0	2	5
49	WILLOW AVE & HERNDON AVE	Signal	29.17	41	0	7	11	23

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Pedestrian Violation	DUI	Unsafe Speed	Other
50	MEDICAL CENTER DR & HERNDON AVE & COVENTRY AVE	Signal	27.14	7	0	2	1	4

Notes: Other crashes include all crashes that are not coded as one of the top primary collision factors
DUI = Driving Under the Influence

Table 9 and Table 10 provide information for the top ten roadway segments (based on crash severity score), including roadway classification, crash severity score, and total number of crashes by collision type or primary collision factor.

Table 9. Priority Roadways Segments with Collision Type based on Top 3 Fatal/Severe Injury Collision Types

#	Location	Classification	Crash Severity Score	Total Number of Crashes	Collision Type			
					Broad -side	Vehicle /Ped	Hit Object	Other
1	SR 168 (Owens Mountain Pkwy to N Dutch Ave)*	Freeway	34.35	3	0	1	0	2
2	N Sunnyside Ave (SR 168 to Locust Ave)	Arterial/Collector	33.13	2	1	0	1	0
3	N Pollasky Ave (N De Witt Ave to Third St)	Local	32.93	1	0	1	0	0
4	Scott Ave (Pollasky Ave to Clovis Ave)	Local	32.93	1	0	1	0	0
5	W Bullard Ave (SR 168 SB on-ramp to SR 168 NB on-ramp)	Arterial/Collector	10.85	15	1	3	0	11
6	Shaw Ave (Railroad Ave to Sunnyside Ave)	Arterial/Collector	7.41	7	0	0	1	6
7	W Teague Ave (N Willow Ave to N Timmy Ave)	Arterial/Collector	7.41	7	1	1	0	5
8	Peach Ave (W Ashlan Ave to E Dakota Ave)	Arterial/Collector	6.59	8	3	2	0	3
9	N Fowler Ave (Herndon Ave to N of Los Altos Ave)	Arterial/Collector	6.10	6	2	1	0	3
10	N Minnewawa Ave (W Teague Ave to W Nees Ave)	Arterial/Collector	5.57	8	4	1	1	2

** Roadway segment is an at-grade Caltrans facility.*
Note: Other crashes include all crashes that are not coded as one of the top three collision types

Table 10. Priority Roadways Segments with Primary Collision Factors based on Top 3 Fatal/Severe Injury Primary Collision Factors

#	Location	Classification	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Unsafe Speed	DUI	Ped Violation	Other
1	SR 168 (Owens Mountain Pkwy to N Dutch Ave)*	Freeway	34.35	3	1	0	0	2
2	N Sunnyside Ave (SR 168 to Locust Ave)	Arterial/Collector	33.13	2	0	0	1	1
3	N Pollasky Ave (N De Witt Ave to Third St)	Local	32.93	1	1	0	0	0
4	Scott Ave (Pollasky Ave to Clovis Ave)	Local	32.93	1	1	0	0	0
5	W Bullard Ave (SR 168 SB on-ramp to SR 168 NB on-ramp)	Arterial/Collector	10.85	15	11	1	0	3
6	Shaw Ave (Railroad Ave to Sunnyside Ave)	Arterial/Collector	7.41	7	4	0	1	2
7	W Teague Ave (N Willow Ave to N Timmy Ave)	Arterial/Collector	7.41	7	4	0	0	3

#	Location	Classification	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Unsafe Speed	DUI	Ped Violation	Other
8	Peach Ave (W Ashlan Ave to E Dakota Ave)	Arterial/Collector	6.59	8	1	0	0	7
9	N Fowler Ave (Herndon Ave to N of Los Altos Ave)	Arterial/Collector	6.10	6	1	0	0	5
10	N Minnewawa Ave (W Teague Ave to W Nees Ave)	Arterial/Collector	5.57	8	1	0	0	7

** Roadway segment is an at-grade Caltrans facility.*
Notes: Other crashes include all crashes that are not coded as one of the top three primary collision factors
DUI = Driving Under the Influence

Education Strategies

Education strategies for Clovis are targeted at unsafe speed and driving or bicycling under the influence of drugs or alcohol. Unsafe speed is the most frequently reported PCF among all reported crashes and the third most frequent in fatal/severe injury crashes. Driving or bicycling under the influence of alcohol and drugs is the third most common PCF cited in fatal/severe injury crashes. In addition, pedestrian and bicycle crashes are an emphasis area that can be addressed with education strategies. Lastly, education strategies can speak to the need to be extra cautious during dark, cloudy, or foggy conditions, given the City's crash history in these conditions.

The Safe Roads Save Lives campaign is a marketing effort led by the Fresno COG, with the goals of:

- Educate all road users on safe transportation behaviors
- Increase safety for people walking and biking
- Highlight behaviors that cause the most crashes in Fresno County—speeding and distracted driving

SAFE ROADS SAVE LIVES

The campaign Includes branding, social media strategies, print materials, radio and video resources, school resources, and a campaign website. Clovis may find these materials helpful, especially those related to the dangers of speeding, looking out for pedestrians, not using the roadway while under the influence, and being extra cautious in lower visibility conditions.

The following activities are recommended for Clovis as they move forward on implementing the Safe Roads Save Lives campaign:

- Identify a team of staff appropriate to attend a presentation by a Fresno COG staff about the Safe Roads Save Lives campaign. Appropriate staff members include staff associated with transportation engineering and planning, communications, traffic enforcement, school transportation, and other jurisdictional staff who work with the roadway system.

- Identify a specific staff member to be the City's lead for the Safe Roads Save Lives campaign deployment. This lead should focus on the following tasks:
    - Identify local transportation and public health advocacy groups that would be interested in helping to promote the Safe Roads Save Lives campaign. Meet with group leaders to better understand how they can participate in the campaign.
    - Work with school districts to distribute print materials and offer school-related transportation resources. Ensure that school communications are in both English and Spanish.
    - Work with public information staff to spread Safe Roads Save Lives materials throughout Clovis through the following channels:
        - Independently implement social media calendar and graphics through jurisdictional accounts. At minimum, repost Fresno COG posts.
        - Have print materials (flyers, bumper stickers, pins, and postcards) available at events and community festivals.
        - Print posters for posting at governmental buildings such as City Hall, libraries, DMVs, and other facilities that the public regularly uses.
        - Identify key outdoor locations in the community that would be effective for larger print advertisement, such as bus shelters, community parks, or billboard locations.
        - Create one or more radio public service announcements (PSAs) and record at least one of the PSAs in Spanish and air it on Spanish-language radio.
        - Have a direct link to Safe Roads Save Lives campaign website from the city's website.

Emergency Services

Emergency service organizations depend on safe roadways and efficient communication processes to reach and effectively respond to emergencies. Each type of emergency services organization that serves Clovis – law enforcement, fire, emergency medical services (EMS), California Highway Patrol – work independently and collaboratively to develop procedures that allow them to respond to incidents in their own jurisdictions as well as support others as needed. The following recommendations may help improve emergency services response as the various organizations update procedures and policies and continue to partner on roadway safety efforts:

- All roadway safety projects should be vetted by emergency service organizations to ensure that their design does not hamper access.
- As new emergency service and response procedures are developed, roadway safety improvement opportunities should be identified and implications of changes to response times should be considered.
- Clovis staff should participate in periodic coordination calls between emergency response agencies to gather and share recent observations about crashes and hot spots, to

understand emergent safety issues that may not have led to policy reports or yet be available through statewide crash reporting systems.

Enforcement

Enforcement strategies can include programs or campaigns specifically focused on changing road user behavior through more visible and active enforcement of existing traffic laws, as well as focusing enforcement in areas that have historically been shown to have higher-than-average crash rates. Typically, the effectiveness of enforcement strategies is temporal, meaning they are effective at changing behavior for a discrete period of time – during and shortly after the increased enforcement activities.

The following enforcement strategies should be considered for Clovis.

- Schedule heightened speed (or other behavior) enforcement checks during strategic times of the year, such as when students return to school or the beginning of fog season.
- Focus speed enforcement efforts in locations with high crash rates.
- Use automatic enforcement, such as red-light cameras or speed feedback signs, especially in school zones.
- Deploy speed feedback signs in areas with high crash rates or speeding citations.

The effectiveness of each strategy should be measured and evaluated, considering the number of staff hours and amount of resources needed. The results should be reviewed and used to refine future enforcement activities.

Enforcement strategies should be undertaken with due caution to avoid inequitable enforcement activities and evaluated to determine the strategy's impact. More details about equitable enforcement can be found on page 8 (Introduction).

EVALUATION AND IMPLEMENTATION

A key part of achieving the City's vision is consistently evaluating roadway safety performance and tracking progress towards the City's goals. The City will develop a process to regularly collect data and information around the performance measures that can be used to assess changes city-wide and at the top priority locations.

As feasible, it is recommended that the City of Clovis update this LRSP every three to five years using updated crash data and the performance measures. Comparing the performance measures related to investments made with the crash data should provide a clear indication of the impact of the City's and safety partner's efforts. Future LRSPs may provide new emphasis areas and top priority locations that reflect progress made and new priorities based on trends in the data.

Activities for implementing the plan include:

- Identifying countermeasures and strategies for priority locations based on the crash data.
- Utilizing the Fresno COG Regional Safety Plan to implement regional strategies and share best practices.
- Exploring funding opportunities to implement priority strategies.
- Identifying key staff and activities to support the regional Safe Roads Save Lives campaign.
- Identifying enforcement strategies to implement and evaluate.
- Regularly coordinating with safety partner agencies to assess progress, identify opportunities to implement countermeasures and strategies, and identify opportunities for citizen involvement.
- Regularly collecting and organizing data to support evaluation of the LRSP.

3.0 CITY OF COALINGA

The City of Coalinga has an approximate population of 16,944.[10] The average daily vehicle miles traveled is 83,135, and the City maintains approximately 58 total roadway centerline miles. The main roadways in the City include California State Route 33, which runs north to south, and E Polk Street, which runs east to west. Based on the review of crash data conducted as part of the LRSP, pedestrians are overrepresented in fatal and severe injury crashes. The top fatal and severe injury collision types in Coalinga were **rear end** and **vehicle-pedestrian** crashes; the top fatal and severe injury primary collision factors were **improper turning** and **automobile right of way**. High priority countermeasures to address these collision types and primary collision factors are shown in Table 15. The LRSP provides potential engineering, education, emergency services, and enforcement strategies tailored to Coalinga's crash history and local priorities, as well as performance measures to evaluate progress.

VISION AND GOALS

The City's vision for roadway safety is:

Enhance the existing roadway network in a cost-effective manner that promotes traffic safety, meets the needs of the community and enriches the lives of residents.

The City's goal in support of the vision are:

1. Have zero fatal and severe injury crashes on the City roadways by 2026.
2. Coordinate with Caltrans on implementing roadway network changes on the state routes that are within the City boundary
3. Regularly review data-informed analysis and community needs to identify and prioritize opportunities to reduce crash risk.
4. Implement low-cost engineering solutions to address common collision types
5. Participate in regional activities to promote roadway safety
6. Maintain a roadway system that provides a quality environment for all users

[10] 2018 population. Source: California Department of Finance

7. Coordinate with traffic safety stakeholders such as fire, police, schools, and parks to exchange information and ideas specific to enhancing roadway safety performance through engineering, enforcement and educational strategies.

SAFETY PARTNERS

A variety of agency staff and community partners were involved throughout the development of this LRSP and played an integral role in identifying priorities, providing local context, and reviewing the existing conditions analysis. Many of the strategies identified in this plan will require coordination with these partners and their support of the City's effort to create a culture of roadway safety. Coalinga's goals reflect the importance of partnering with traffic safety stakeholders and participating in regional activities to enhance roadway safety performance. While additional partners may be identified in the future, those involved in development of the LRSP include:

- Coalinga Fire Department
- Coalinga Police Department
- Coalinga-Huron Unified School District
- Fresno Council of Governments
- Public Works and Utilities

PERFORMANCE MEASURES

Performance measures are used to track progress and a key element of making data-informed decisions. Performance measures that support the City's vision, goals, and emphasis areas include:

- Annual number of crashes (city-wide and at each of the top twenty priority locations)
- Annual number of fatal and severe injury crashes (city-wide and at each of the top twenty priority locations)
- Annual number of pedestrian and bicycle crashes (city-wide and at each of the top twenty priority locations)
- Annual number of rear end crashes (city-wide)
- Annual number of crashes at intersections (city-wide)
- Investments made in roadway safety countermeasures (e.g. dollars spent, grants pursued, partnerships developed)
- Investments made in education and enforcement strategies (e.g. dollars spent, grants pursued, partnerships developed)
- Coordination with other local agencies and/or safety partners (e.g. meetings held, projects pursued)

As part of plan implementation, the City will identify a process for annually tracking these performance measures to support future updates to this roadway safety plan.

DATA SUMMARY

The primary data sets used to inform the technical analyses for the City's local road safety plan were crash data and roadway network information. As noted below, future updates could incorporate traffic volume data if widely available for locations across the City. In addition, feedback from a publicly available survey was documented for consideration in identifying issues and improvement strategies.

Public Survey Feedback

Toole Design Group worked with Fresno COG to develop an online survey and interactive webmap to provide the opportunity for public engagement on the LRSP. The goal was to collect both general and geographically specific feedback on safety problems, desired safety improvements in jurisdictions that are part of the MLRSP, as well as voluntary demographic information for Title IV reporting. Both activities were from August 16, 2021 to September 20, 2021 and sought public feedback on spatial patterns of traffic safety concerns and desired improvements.

As the primary open public engagement opportunity during MLRSP development, the survey and interactive webmap served a crucial role in illuminating the community's traffic safety concerns and desired traffic safety improvements. Below is a summary of key findings from the online survey and interactive webmap specific to Coalinga. More information on the methodology and overall findings of the survey are provided in *Appendix A*.

6
PEOPLE RESPONDED

0
LOCATIONS IDENTIFIED

WHERE PARTICIPANTS WORK AND LIVE

MOST NEEDED SAFETY IMPROVEMENTS

- Pedestrian crossing improvements
- Speed enforcement
- Maintenance of existing roads and streets
- Rural road improvements to prevent run-off-road crashes

- The survey asked respondents to provide input on the top road safety improvements needed in their communities. While the survey prompted participants to pick three improvements, some selected more than three responses. A total of 23 responses were received for Coalinga from 6 participants, with the most common desired improvement types including:
    - Pedestrian crossing improvements (4 responses)
    - Speed enforcement (4 responses)
    - Maintenance of existing roads and streets (3 responses)
    - Rural road improvements to prevent run-off-road crashes (3 responses)
    - Sidewalks (3 responses)
- Participants dropped points in the webmap in specific locations across Fresno County where they experienced road safety concerns. No locations were identified in Coalinga.
- The survey asked participants where they live and work or study, with the option to select either outside of Fresno County or from a list of jurisdictions within the County. The participants who selected Coalinga included:
    - 2 who live and work/study in Coalinga
    - None who live in Coalinga and work/study outside of Coalinga
    - 4 who work/study in Coalinga and live outside of Coalinga

Crash Data

Kittelson worked with Fresno COG to assemble crash data for the City of Clovis using the Statewide Integrated Traffic Records System (SWITRS) database, supplemented with location information from the Transportation Injury Mapping System (TIMS) database maintained by SafeTREC at the University of California, Berkeley. Throughout this report, crashes are associated with a jurisdiction based on the reporting officer's assessment of location.

The crash database represents the time period from January 1, 2015 through December 31, 2019 and includes reported crashes that occurred on public streets. Within the assembled regional crash database, a total of 378 reported crashes are located in Coalinga. Crash severity is coded according to the highest degree of injury exhibited, and the data used for this analysis includes the following coded severity levels (listed in descending order):

- Fatal: death from injuries sustained in the crash.
- Severe Injury: Injuries include, for example, broken bones, severe lacerations, or other injuries that go beyond the reporting officer's assessment of "other visible injuries."
- Other visible injury: An injury, other than those described above, that is evident to observers at the scene of the crash. For example, bruises or minor lacerations.
- Complaint of pain: Internal or other non-visible injuries. For example, a person limps or seems incoherent.
- Property damage only (PDO): No injuries sustained.

Roadway Network Data

Kittelson developed a linear referencing system of all public roadways using the Fresno County roadway centerline file. This dataset was updated to develop a measurement system based on the total road length (as determined by roadway name) to locate crashes to a specific mile point along the network. The master roadway network for the County was used to spatially analyze and prioritize specific locations within each local jurisdiction.

Traffic Volume Data

Traffic volume data was not consistently available at a sufficient level to be able to incorporate into the safety analysis. Future updates to the City's local road safety plan could incorporate traffic volume data, if available, to understand how crash frequency, severity, and type vary at different levels of traffic.

EXISTING ROADWAY SAFETY PERFORMANCE

The findings in this section are based on the crash database, which includes reported crashes from January 1, 2015 through December 31, 2019. It is organized as follows:

- All Road Users
  - Severity by Road User
  - Year, Month, and Weather
  - Collision Type
  - Location, Collision Type, and Severity
  - Primary Collision Factor
  - Lighting
  - Time of Day
- Pedestrian-involved Crashes
  - Year and Month
  - Pedestrian Action and Location
  - Lighting
- Bicyclist-involved Crashes
  - Collision Type
  - Primary Collision Factor
  - Lighting

All Road Users

This section includes analysis and findings for all reported crashes. Subsequent sections focus exclusively on crashes involving pedestrians and bicyclists.

SEVERITY BY ROAD USER

Table 11 summarizes number of reported crashes by road user and severity of those crashes. Notable trends include:

- Pedestrians are overrepresented in fatal and severe injury crashes. Pedestrians are involved in 4 percent of reported crashes but are involved in 22 percent of fatal/severe injury crashes.
- Of the nine reported severe injury crashes, pedestrians were involved in two and a motorcyclist in one.

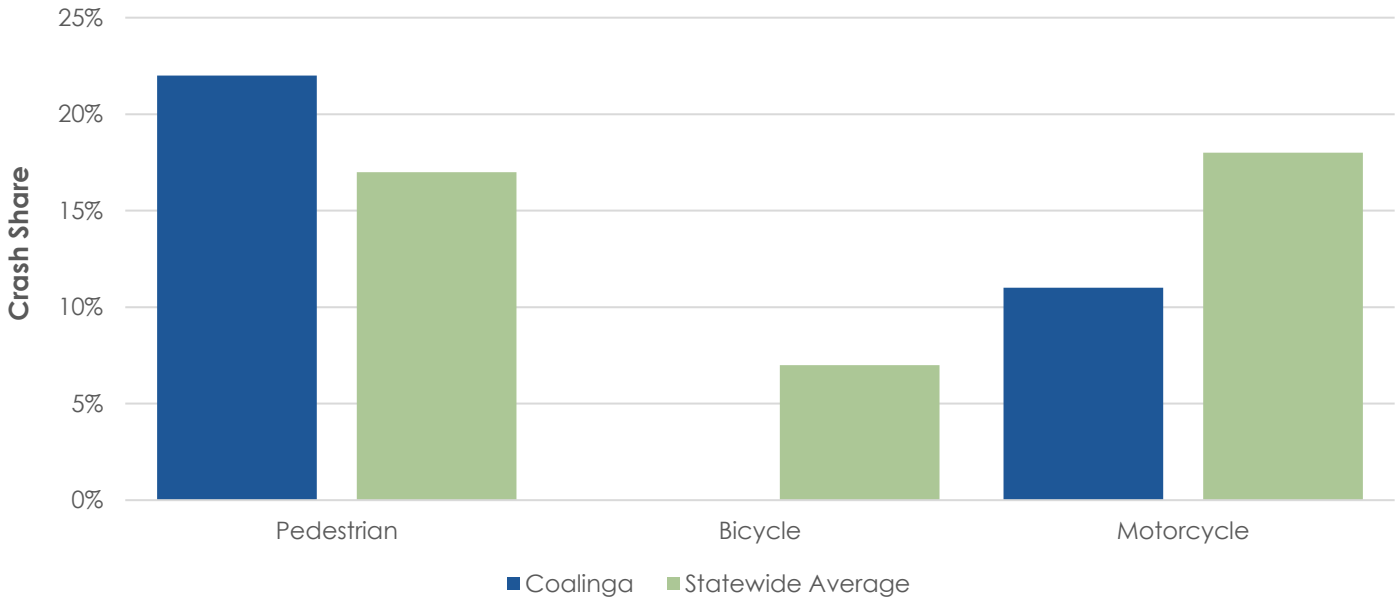
Table 11: Crash Severity by Road User Involved

Road User Involved	Fatal (% of column)	Severe Injury (% of column)	Visible Injury (% of column)	Complaint of Pain (% of column)	Property Damage Only (% of column)	Total (% of column)
Pedestrian Involved	0 (0%)	2 (22%)	7 (23%)	5 (13%)	1 (0%)	15 (4%)
Bicycle Involved	0 (0%)	0 (0%)	4 (13%)	1 (3%)	0 (0%)	5 (1%)
Vehicle Only or Vehicle-Fixed Object	0 (0%)	7 (78%)	19 (63%)	34 (85%)	298 (100%)	358 (95%)
Reported Crashes	0 (0%)	9 (100%)	30 (100%)	40 (100%)	299 (100%)	378 (100%)
Severity Share of Reported Crashes	0%	2%	8%	11%	79%	100%

Source: SWITRS, TIMS, Kittelson, 2021.

The California's Strategic Highway Safety Plan (SHSP) includes 16 challenge areas to focus statewide resources and efforts. Three of those challenge areas are crashes involving pedestrians, bicyclists, and motorcyclists. The SHSP analyzed the share of fatal and severe injury crashes involving each of these road users. Figure 23 compares crash trends in the City of Coalinga to the statewide trends reported in California's Strategic Highway Safety Plan. City of Coalinga has a higher share of pedestrian crashes among fatal/severe crashes compared to the statewide average.

Figure 23: Fatal and Severe Injury Crash Shares by Road User Compared to Statewide Trends

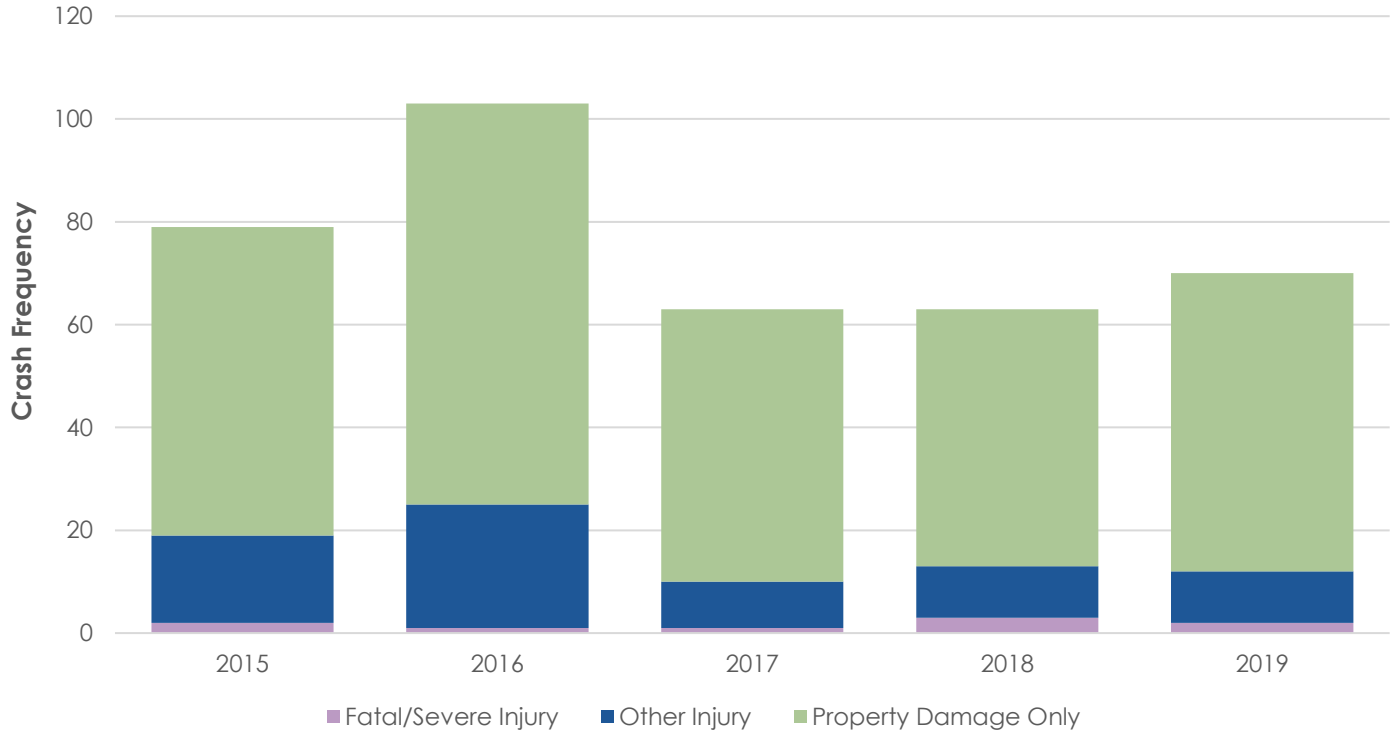


Source: SHSP, SWITRS, TIMS, Kittelson, 2021.

YEAR, MONTH, AND WEATHER

Figure 24 shows year-over-year trends in the data, by severity. The data does not show a consistent trend over time. On average, 76 total crashes and two fatal/severe injury crashes occurred each year. The highest number of crashes were reported in 2016.

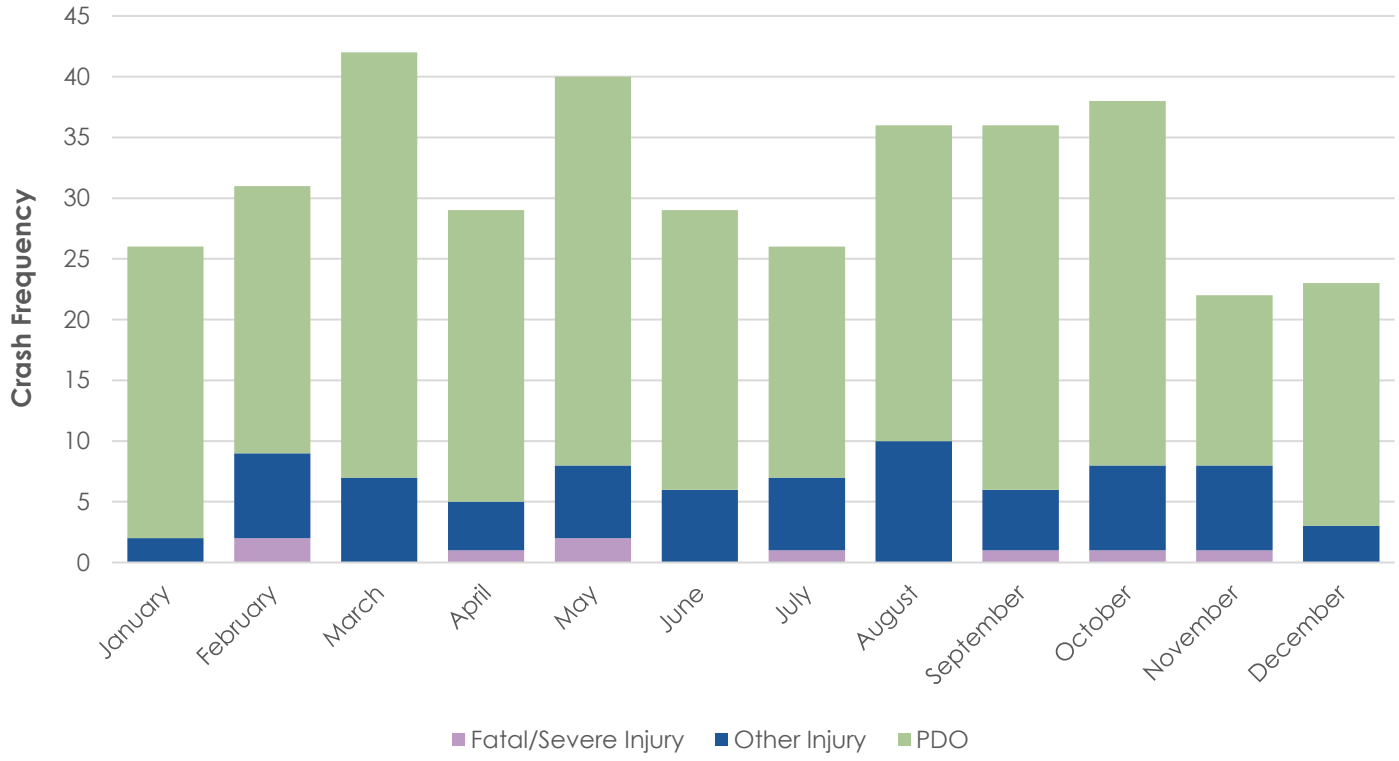
Figure 24: Year-over-Year Trends in Crash Data by Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes.

Figure 25 presents the total crashes by month and severity for the crash database. On average, 32 crashes occurred per month. November and December are notably lower than the monthly average and March and May notably higher than the monthly average.

Figure 25: Crashes by Month and Severity

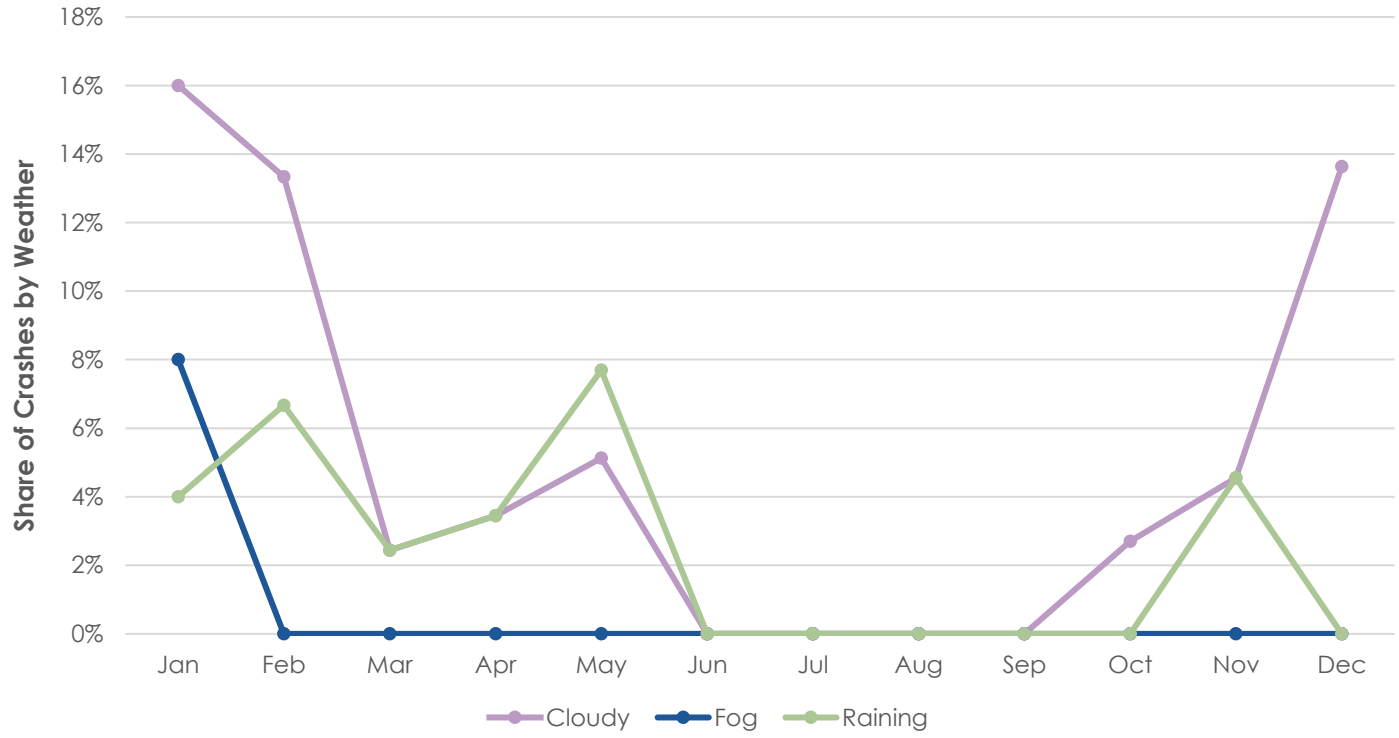


Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

Figure 26 illustrates crashes by month and by weather conditions. The most common weather condition, clear weather, is not shown in the chart below to highlight weather's factor on crash trends. As shown in the figure:

- Crashes recorded to have occurred under or during fog, cloudy, and/or raining are shown to be at their lowest in the months of June to September and increase through October to May.
- Crashes reported as occurring in cloudy conditions peak through the months of December through February. Crashes occurring in foggy conditions show a spike in January, constituting 8 percent of reported crashes; they are a negligible share in other months.

Figure 26: Crashes by Month and Weather Condition



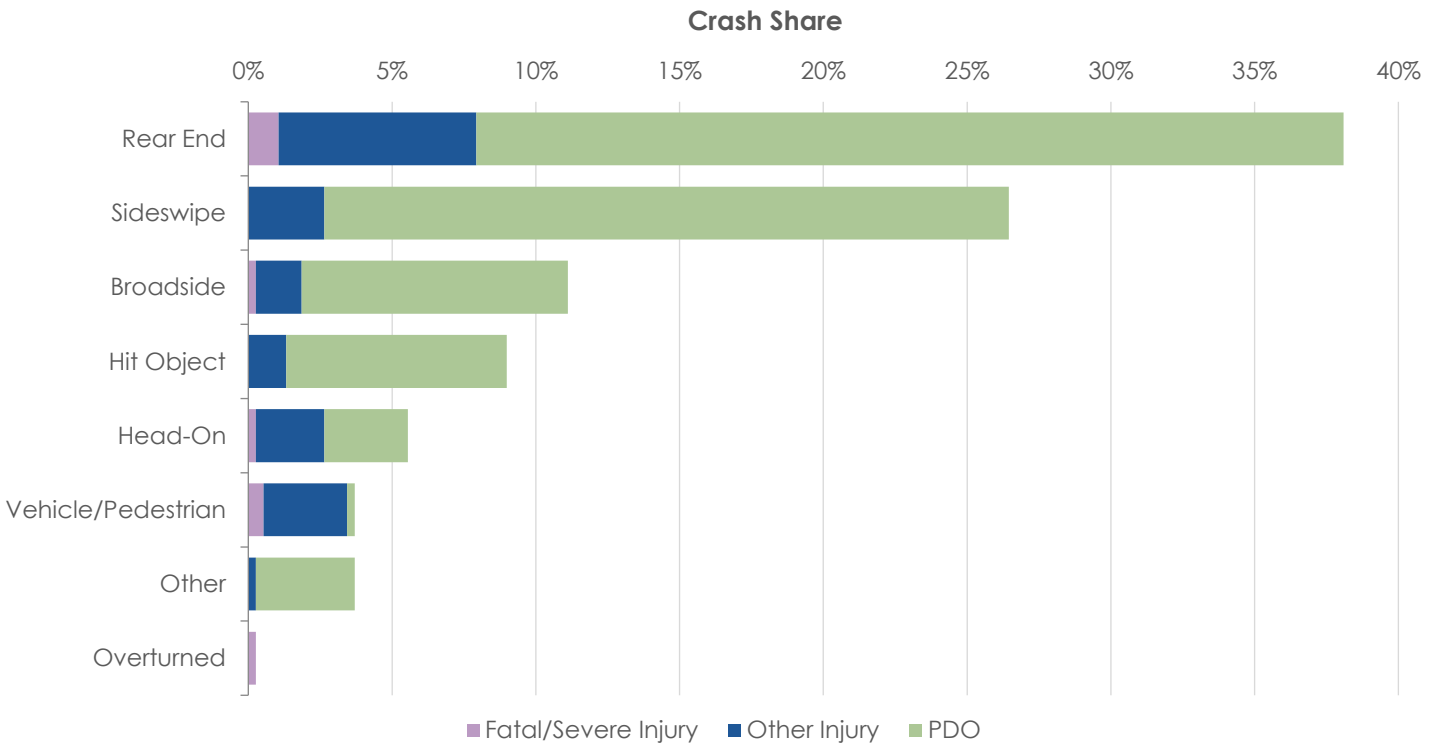
Source: SWITRS, TIMS, Kittelson, 2021.
Note: Only select conditions shown to improve legibility for less frequent weather conditions.

COLLISION TYPE

Figure 27 reports the most frequent reported collision types by severity.

- Among total reported crashes, the top three most frequent collision types are **rear end** (38 percent), **sideswipe** (26 percent), and **broadside** crashes (11 percent). These three collision types account for 75 percent of reported crashes citywide.
- Among fatal/severe injury crashes, the top two collision types are **rear end** (44 percent), and **vehicle/pedestrian** (22 percent). **Broadside, head-on**, and **overturned** crashes each accounted for one severe injury crash.

Figure 27: Crashes by Collision Type and Severity



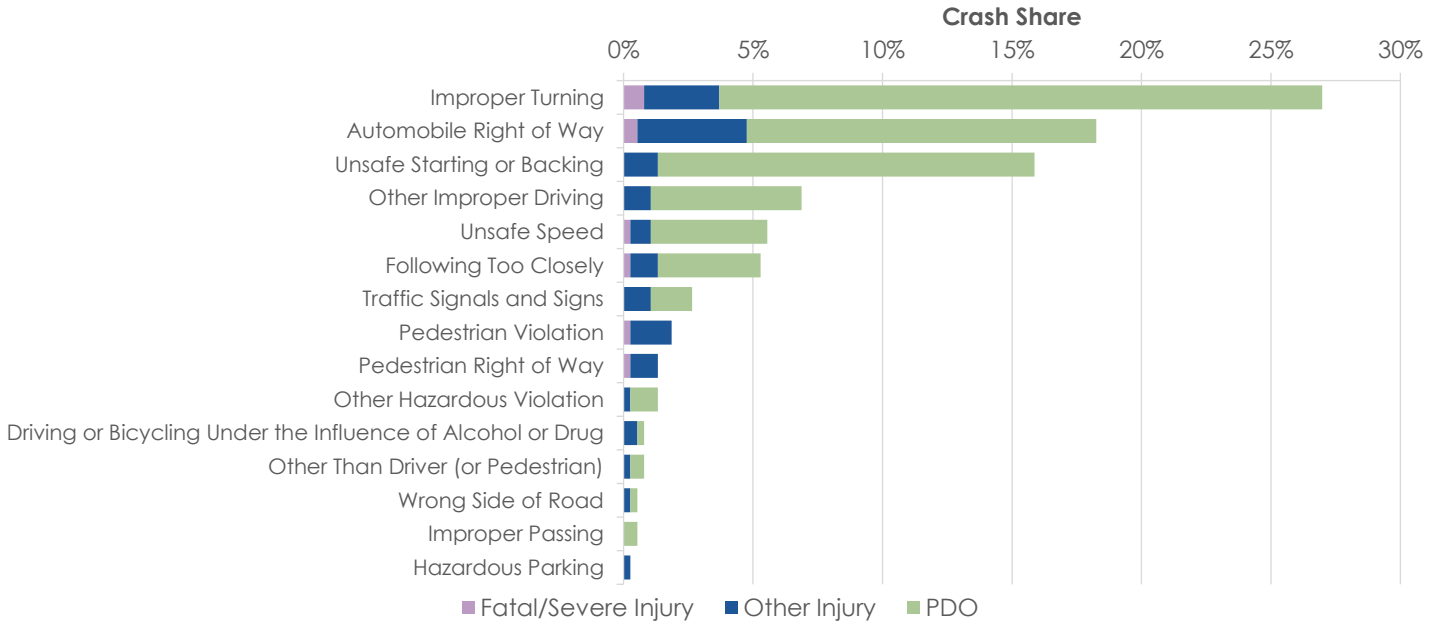
Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

PRIMARY COLLISION FACTOR

Reporting officers identify a primary collision factor (PCF) for each crash. It is up to the officer's judgement and information available at the scene for them to select the factor that is most relevant. Officers select one from among a list of PCFs based on California Vehicle Code (CVC) and road user behavior. Figure 28 presents the most frequently cited PCFs.

- Among total reported crashes, the three most frequently reported PCFs are **improper turning**[11] (27 percent), **automobile right of way**[12] (18 percent), and **unsafe starting or backing**[13] (16 percent). These three account for 61 percent of reported crashes.
- Among fatal/severe injury crashes, the two most frequently reported PCFs are **improper turning**[11] (33 percent) and **automobile right of way**[12] (22 percent). **Unsafe speed**[14], **following too closely**, **pedestrian right of way**, and **pedestrian violation**[15] were each reported in one fatal/severe injury crash.

Figure 28: Crashes by Reported PCF and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Notes: PCFs constituting <1% excluded from chart to enhance legibility. Those PCFs include other equipment, impeding traffic, lights, and brakes.
"Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

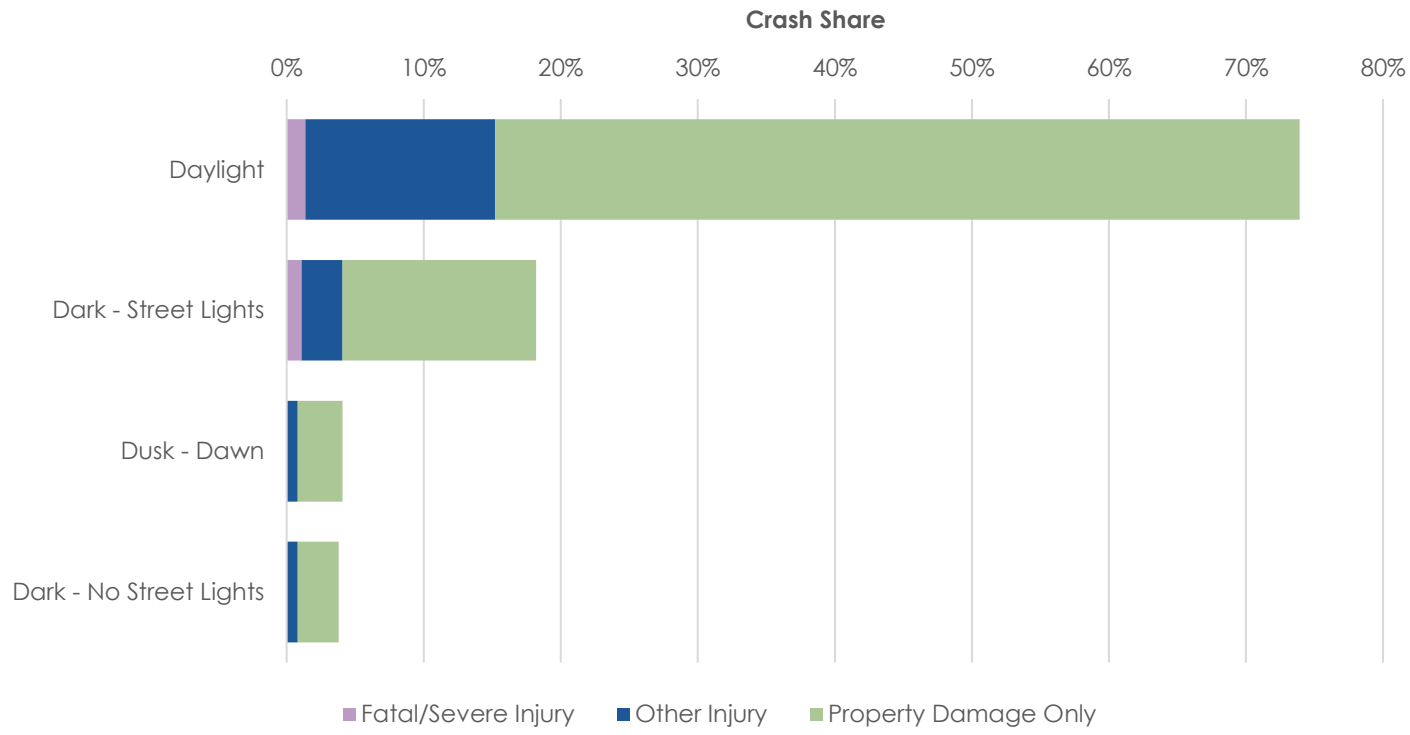
[11] Reported PCF based on CVC violation indicating a failure while turning from a direct course without reasonable safety or not signaling appropriately.
[12] Reported PCF based on CVC violation indicating a driver turning failed to yield right-of-way to oncoming traffic.
[13] Reported PCF based on CVC violation indicating unsafe starting or backing of the vehicle.
[14] Reported PCF based on CVC violation indicating unsafe speeding on a highway.
[15] Reported PCF based on CVC violation indicating a pedestrian failure to yield the right of way to other vehicles.

LIGHTING

Figure 29 shows citywide crashes by reported lighting and severity.

- Crashes that occurred in daylight conditions make up 72 percent of total reported crashes, and account for four of the nine reported fatal/severe injury crashes.
- Approximately 18 percent of crashes occurred at night under streetlights reported to be working. Of those crashes, four resulted in death or severe injury.

Figure 29: Crashes by Lighting and Severity

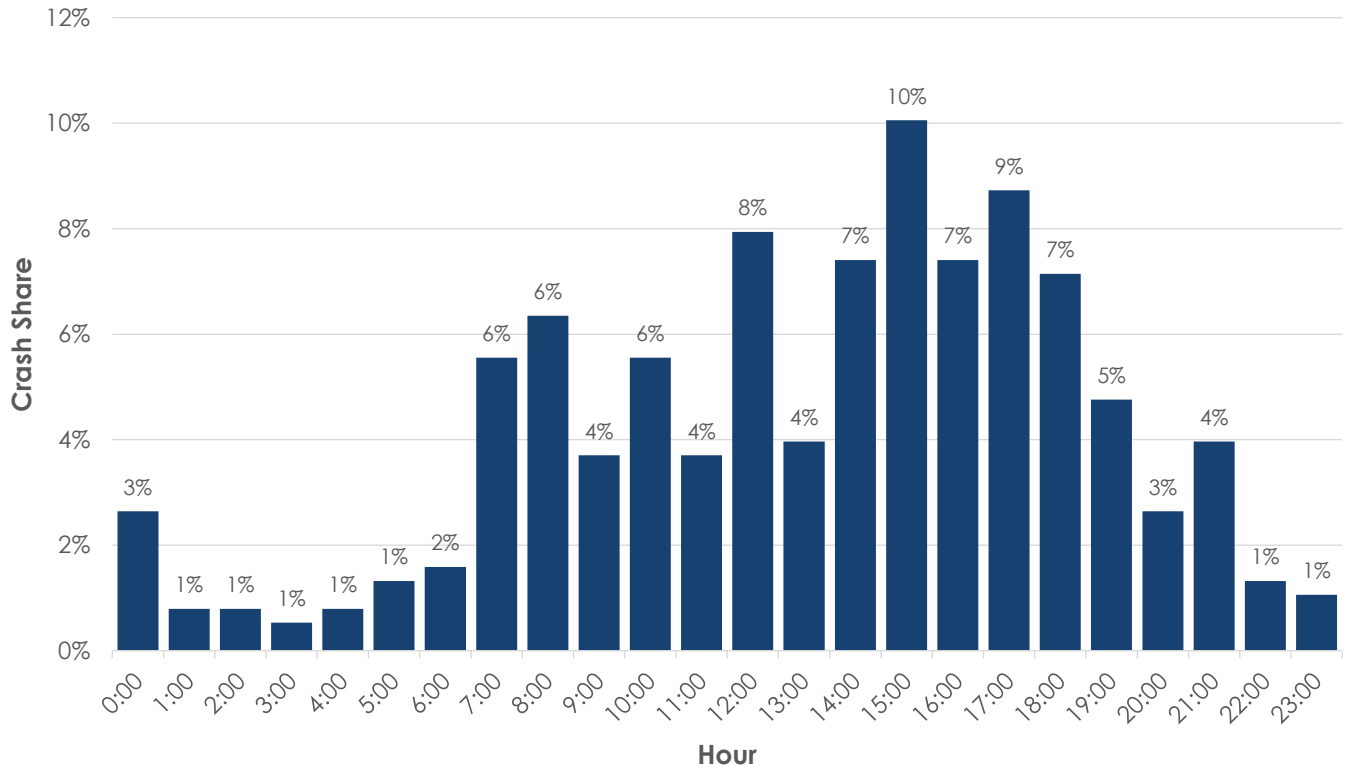


Source: SWITRS, TIMS, Kittelson, 2021
Notes: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes.
10 crashes were reported as not stated.

TIME OF DAY

Figure 30 shows crashes by time of day. In the morning, crashes peak from 7 AM to 9 AM. Afternoon crashes are highest from 2 PM to 6 PM with a peak from 3 PM to 4 PM.

Figure 30: Crash Share by Time of Day



Source: SWITRS, TIMS, Kittelson, 2021.

Pedestrians

Table 12 shows reported pedestrian crashes by severity. Of the 15 reported pedestrian crashes, two crashes resulted in a severe injury. There were no reported fatalities.

Table 12: Pedestrian Involved Crashes by Severity

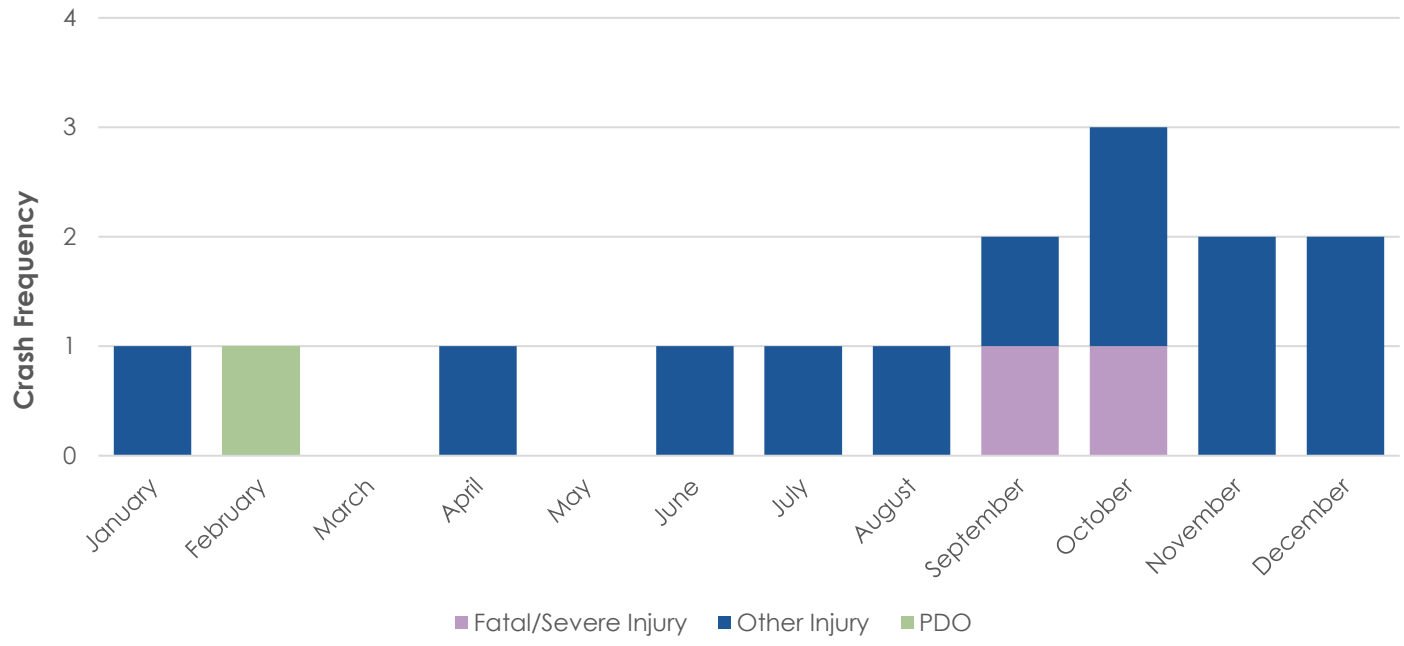
	Fatal (% of Total)	Severe Injury (% of Total)	Visible Injury (% of Total)	Complaint of Pain (% of Total)	Property Damage Only (% of Total)	Total
Pedestrian Involved	0 (0%)	2 (13%)	7 (47%)	5 (33%)	1 (7%)	15 (100%)

Source: SWITRS, TIMS, Kittelson, 2021.

SEVERITY AND MONTH

Figure 31 presents pedestrian crashes organized by month and severity with an average rate of one crash per month. The months between September and December show an increase in frequency with the most reported crashes in October. These trends should be interpreted with caution given the limited number of total reported crashes.

Figure 31: Pedestrian Crashes by Month and Severity



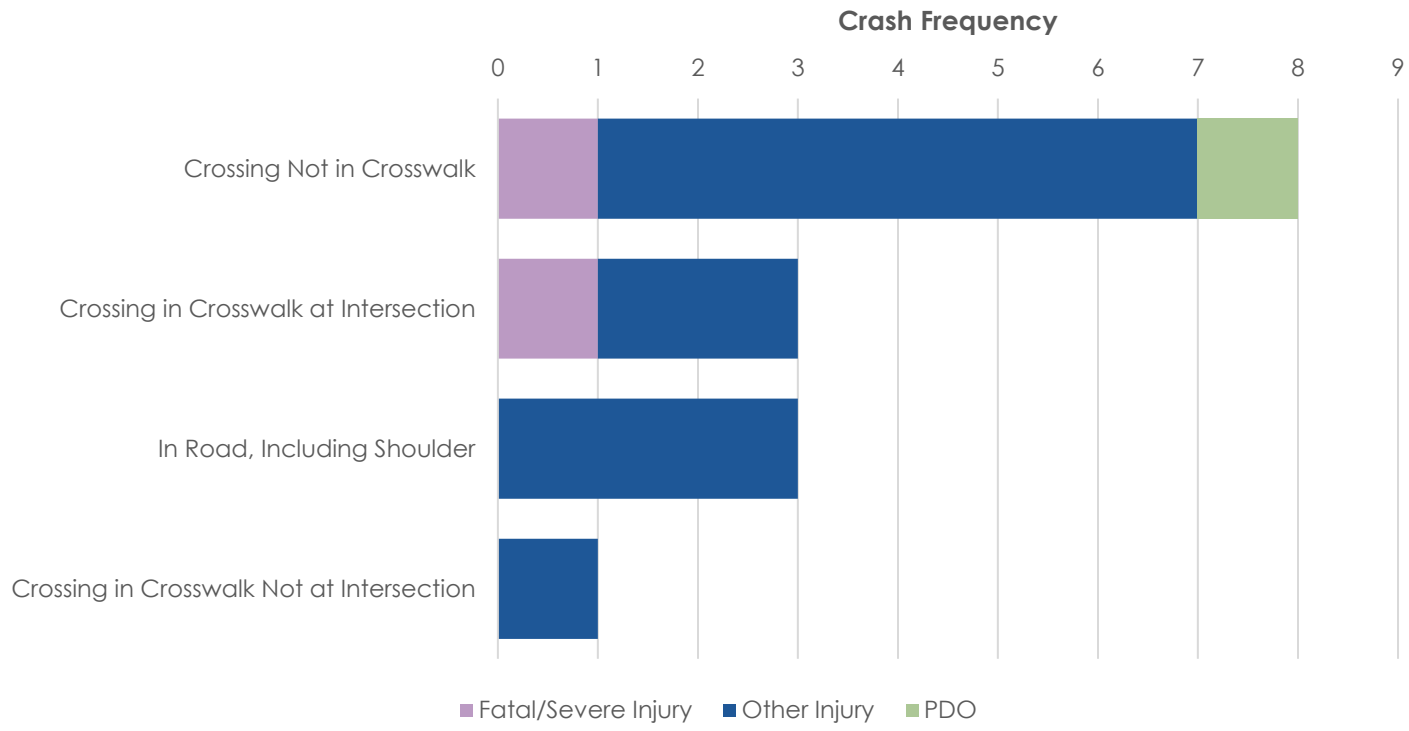
Source: SWITRS, TIMS, Kittelson, 2021
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

PEDESTRIAN ACTION AND LOCATION

For pedestrian crashes, data are coded according to the reporting officer's judgment about the pedestrian's action and location preceding the crash. Figure 32 reports these trends for the City.

- The most commonly cited pedestrian action and location was when a pedestrian was crossing not in crosswalk (53 percent).
- The second and third most common pedestrian actions preceding a crash included crossing in a crosswalk at an intersection (20 percent) and walking in the road, including along the shoulder (20 percent).

Figure 32: Pedestrian Crashes by Reported Action/Location and Severity



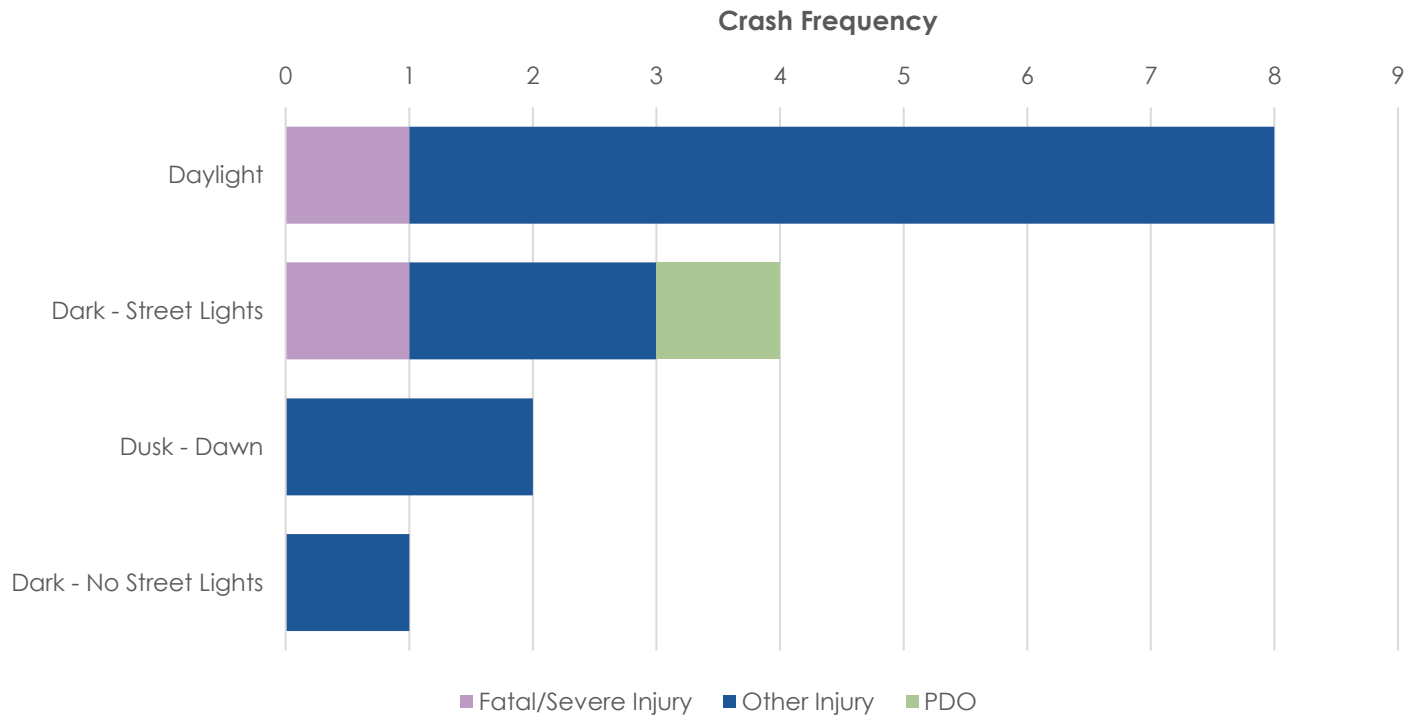
Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

LIGHTING

Figure 33 shows citywide pedestrian crashes by reported lighting condition and severity.

- Approximately half of crashes occurred during daylight and half under dark or low light conditions.
- Four of the 15 reported pedestrian crashes (and one of the two fatal/severe injury crashes) occurred in dark conditions under streetlights.

Figure 33: Pedestrian Crashes by Lighting and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

Bicyclists

This section focuses exclusively on reported crashes involving bicyclists. Table 13 presents reported bicyclist-involved crashes citywide organized by severity level. Of the five bicyclist crashes in the City, there were no reported fatal or severe injuries. The five crashes resulted in either visible injury or complaint of pain.

Table 13: Bicycle User Involved Crashes by Severity

	Fatal (% of total)	Severe Injury (% of total)	Visible Injury (% of total)	Complaint of Pain (% of total)	Property Damage Only (% of total)	Total (% of total)
Bicycle Involved	0 (0%)	0 (0%)	4 (80%)	1 (20%)	0 (0%)	5 (100%)

Source: SWITRS, TIMS, Kittelson, 2021.

COLLISION TYPE

There were five reported bicycle crashes and among those three were recorded as **rear end** crashes with visible injuries. One crash was a **vehicle/pedestrian crash** with the bicyclist at fault and one crash was reported as **other**; these likely indicate a lack of precision in crash reporting for bicycle-involved crashes.

PRIMARY COLLISION FACTOR (PCF)

The PCF for these bicycle crashes were evenly distributed, with one crash each reported **improper turning**[16], **automobile right of way**[17] (with the motorist at fault), **other improper driving**[18], **traffic signals and signs**[19], **wrong side of the road**[20].

LIGHTING

Three of the bicycle crashes occurred during the day and the remaining two crashes occurred in the dark with working streetlights.

[16] Reported PCF based on CVC violation indicating a failure while turning from a direct course without reasonable safety or not signaling appropriately.
[17] Reported PCF based on CVC violation indicating a driver turning failed to yield right-of-way to oncoming traffic.
[18] Reported PCF based on CVC violation indicating driving from a direct course without reasonable safety or not signaling appropriately.
[19] Reported PCF based on CVC violation indicating running a red light or failure to stop at a stop sign.
[20] Reported PCF based on CVC violation indicating the driver/rider was on the wrong side of the road.

Priority Locations

Kittelson identified priority intersections and segments in Coalinga using the annualized crash severity scores and excess predicted crashes described in the Data Summary and Analysis Approach sections (see the Introduction).

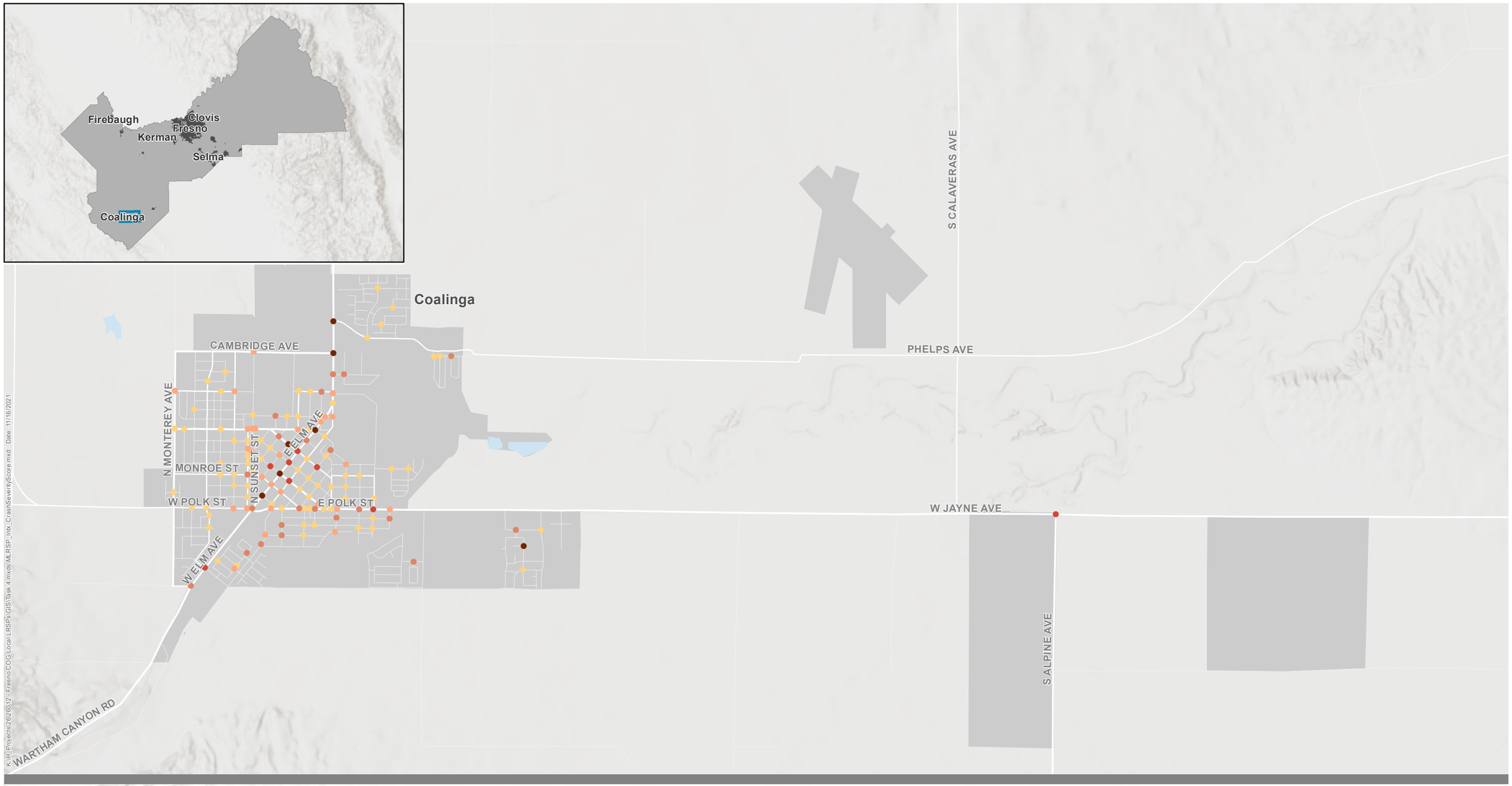
For intersection locations, the crash severity scores ranged from zero (no reported crashes during the five years) to 44.02. Figure 34 shows the results of the crash severity scoring. Figure 35 shows excess predicted crash scores by percentiles for intersection locations. For the half-mile roadway segments, the crash severity scores ranged from zero to 35.27. Crash severity score results for roadway segments are shown in Figure 36. Excess predicted crash score results are shown in Figure 37. Intersections or segments shown as not falling within one of the percentile breaks indicates there were no reported crashes at that location.

Table 14 presents the top twenty locations with the highest crash severity scores.

Table 14. Top 20 Locations based on Crash Severity Score

#	Location	Type	Crash Severity Score	Total Number of Crashes	Severity				
					Fatal	Severe Injury	Other Visible Injury	Complaint of Pain	PDO
1	ELM AVE & SEVENTH ST	Unsignalized	44.02	11	0	1	1	2	7
2	ELM AVE & FIFTH ST	Unsignalized	41.78	10	0	1	1	0	8
3	ELM AVE & CAMBRIDGE AVE	Unsignalized	40.58	4	0	1	1	0	2
4	ELM AVE & FIRST ST & VAN NESS ST	Unsignalized	39.65	9	0	1	0	0	8
5	LONGHOLLOW WAY & POPPY MEADOW CT	Unsignalized	38.25	2	0	1	0	0	1
6	POLK STREET FROM HAYES ST TO HACHMAN ST	Segment	35.27	3	0	1	1	0	1
7	DURIAN AVE & THIRD ST	Unsignalized	38.25	2	0	1	0	0	1
8	SR 198 FROM LUCILLE AVE TO 7TH ST	Segment	33.33	3	0	1	0	0	2
9	ELM AVE & PHELPS AVE & OIL CITY RD	Signalized	27.45	9	0	1	1	0	7
10	FOREST AVE & FIFTH ST	Unsignalized	7.79	14	0	0	1	3	10
11	JAYNE AVE FROM QUAIL CREEK RD TO ALPINE AVE	Segment	6.47	16	0	0	1	5	10
12	JAYNE AVE FROM PLEASANT VALLEY STATE PRISON TO COALINGA DEPT OF STATE HOSPITAL	Segment	5.77	9	0	0	1	2	6
13	ELM AVE & FOURTH ST	Unsignalized	5.36	12	0	0	1	1	10
14	POLK ST & GARFIELD ST	Unsignalized	5.25	11	0	0	0	3	8
15	GLENN AVE & THIRD ST	Unsignalized	3.56	3	0	0	1	1	1
16	DURIAN AVE & FIFTH ST	Unsignalized	3.54	8	0	0	1	0	7
17	ELM AVE & THIRD ST	Unsignalized	3.43	7	0	0	0	2	5
18	ELM AVE & PACIFIC ST	Unsignalized	2.94	5	0	0	1	0	4
19	ALPINE AVE & JAYNE AVE	Unsignalized	2.94	5	0	0	1	0	4
20	FOREST AVE & SACRAMENTO ST	Unsignalized	2.83	4	0	0	0	2	2

Note: PDO = Property Damage Only



Crash Severity Score

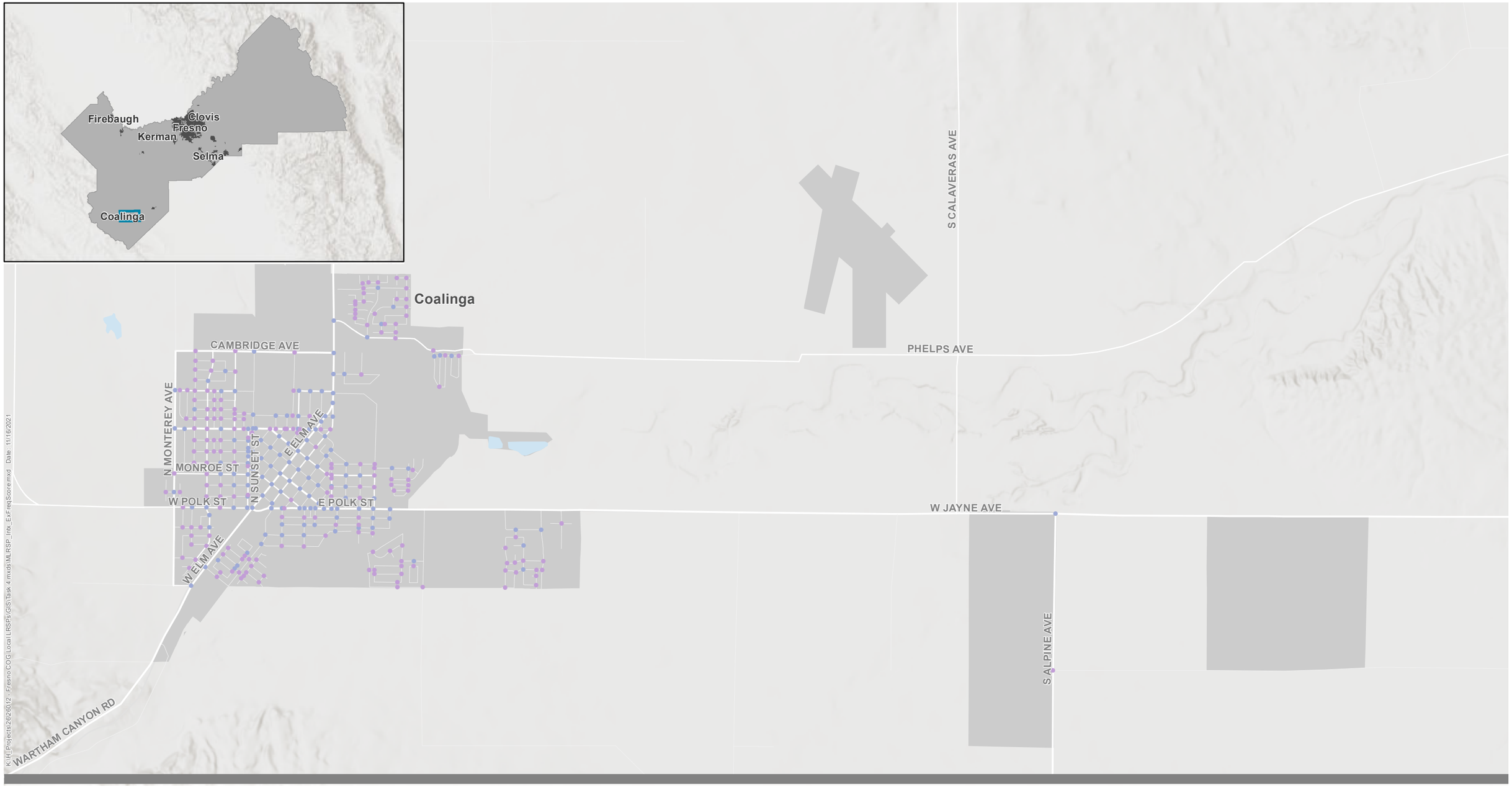
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 0.6 Miles

Figure 34

Intersection Crash Severity Scores
Jurisdiction Results: Coalinga
Fresno Council of Governments

KITTELSON & ASSOCIATES



Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile

City Limits

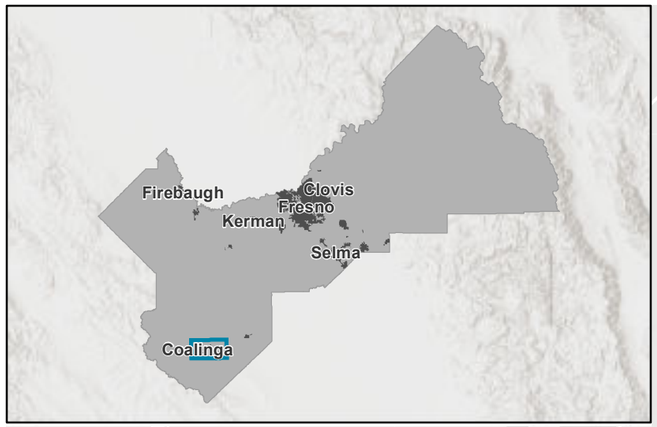
County Boundary

0 0.6 Miles

Figure 35

Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Coalinga
Fresno Council of Governments

KITTELSON & ASSOCIATES



Coalinga

CAMBRIDGE AVE

N MONTEREY AVE

E ELM AVE

W POLK ST

E POLK ST

W ELM AVE

WARTHAM CANYON RD

S CALAVERAS AVE

PHELPS AVE

S EL DORADO AVE

W JAYNE AVE

S ALPINE AVE

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Crash Severity Scores

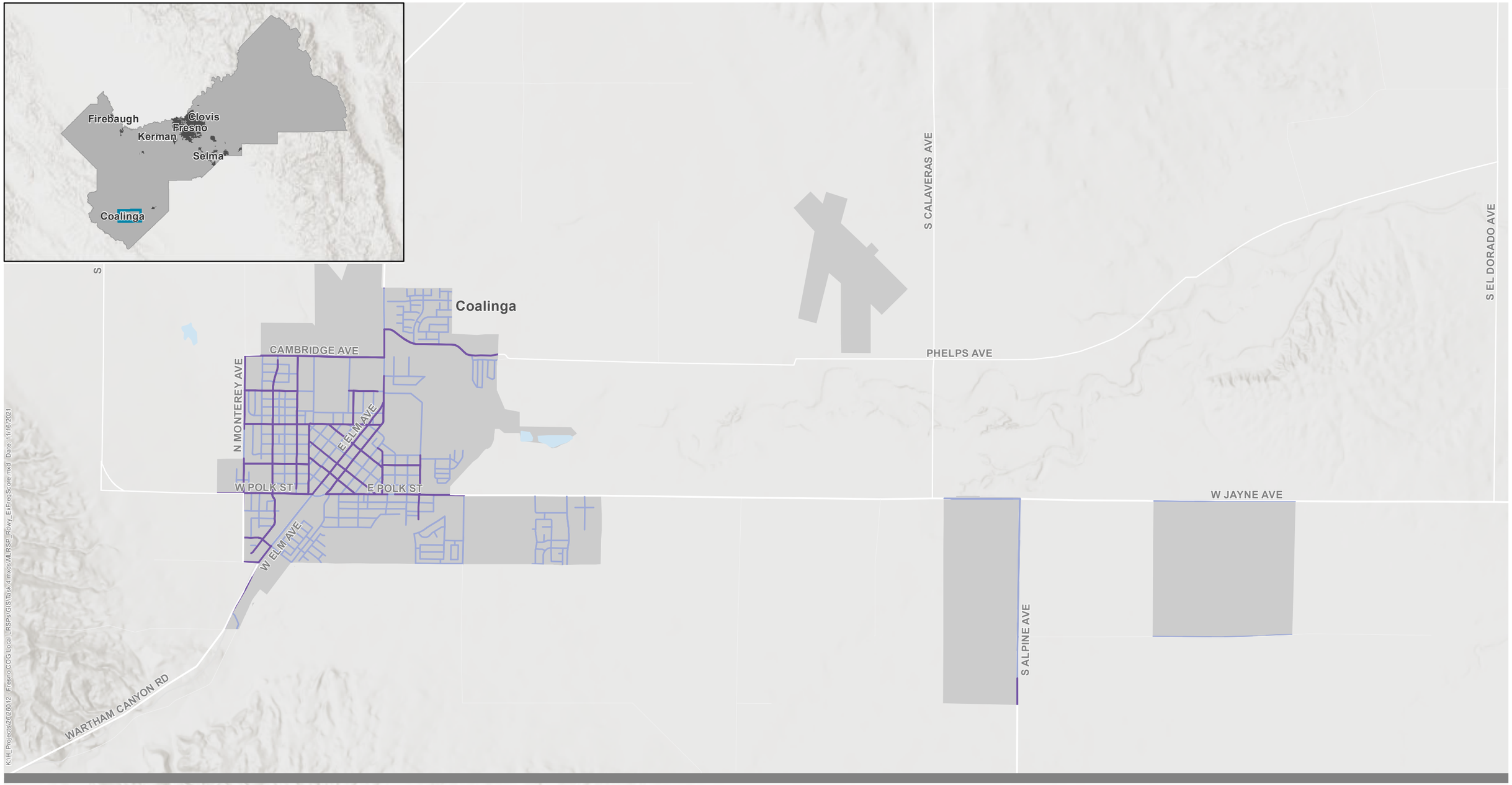
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 0.6 Miles

Figure 36

Roadway Crash Severity Scores
Jurisdiction Results: Coalinga
Fresno Council of Governments

KITTELSON & ASSOCIATES



Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 0.6 Miles

Figure 37

Roadway Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Coalinga
Fresno Council of Governments

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EMPHASIS AREAS

Based on key trends in the crash data, emphasis areas for the City of Coalinga include rear end crashes, pedestrian crashes, and intersection control and approach.

Rear End Crashes

Rear end crashes were identified as a focus area given their prevalence in reported crashes. Rear end crashes are the most common collision type, cited in 38 percent of all crashes. Four of the nine severe injury crashes are rear end crashes as are 26 of the 70 other injury crashes, making rear end crashes the most common collision type in injury crashes. As discussed below under Engineering Strategies, countermeasures are available targeted at rear end crashes.

Pedestrian Crashes

Pedestrian crashes were identified as a focus area given the overrepresentation of pedestrians in fatal and severe crashes. Two of the nine severe crashes involved a pedestrian. The most common pedestrian action preceding a crash was crossing the roadway outside a crosswalk, followed by crossing the roadway at a crosswalk. This suggests opportunities for improvements to pedestrian infrastructure.

Pedestrians are identified as one of the six high priority challenge areas in the California SHSP. These challenge areas "were identified through historical data evaluations and feedback from traffic safety stakeholders across the state" (Caltrans SHSP). The high priorities represent "the greatest opportunity to reduce fatalities and serious injuries across the state" (Caltrans SHSP).

Intersection Control and Approach

The top three fatal and severe injury primary collision factors of improper turning, automobile right of way, and unsafe starting and backing were primarily cited in rear end (83 crashes), sideswipe (64 crashes), broadside (37 crashes), and hit object crashes (11 crashes). These collectively indicate that drivers are not properly following indications provided on roadways and at intersections in the City.

The California SHSP includes intersections as one of the six high priorities in California. These crashes are a high priority due to their severity level often as a result of rear-end, broadside, and hit object collision types. "Intersections significantly increase driver workload because they are a natural point of conflict. If present, traffic control devices help to mitigate that workload by providing clear rules of right-of-way" (Caltrans SHSP). As discussed below under Engineering Strategies, several roadway and intersection countermeasures are available targeted at improving driver awareness and expectation as well as improving the roadway to minimize risk of crashes.

STRATEGIES

The following subsections present engineering, education, emergency services, and enforcement strategies to help improve roadway safety within the City of Coalinga.

Engineering Strategies

The top two fatal and severe injury collision types in Coalinga were **rear end** and **vehicle-pedestrian** crashes, and **sideswipe** was a frequently reported collision type. The top three fatal and severe injury primary collision factors were **improper turning** and **automobile right of way**, and **unsafe starting and backing** was a frequently reported primary collision factor High priority countermeasures to address these collision types and primary collision factors are shown in Table 15.

Table 15. High Priority Countermeasures

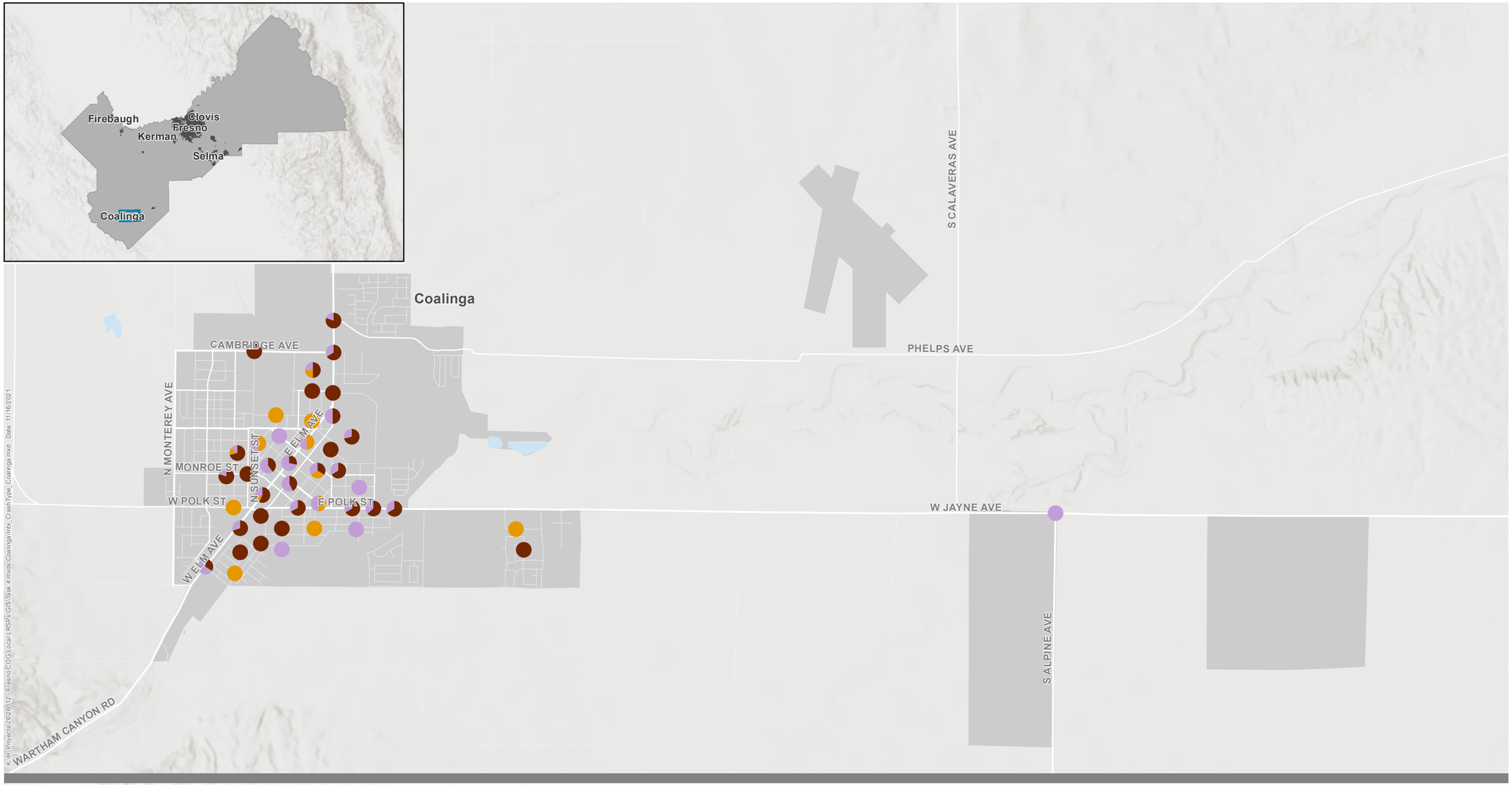
	Countermeasure Name	ID	Crashes Addressed
Roadway Countermeasures	Street Lighting	R1	Crashes at night
	Install Raised Median	R8	Improper turning
	Widen Shoulder	R15	Sideswipe
	Improve Pavement Friction (High Friction Surface Treatment)	R21	Rear end
	Install/Upgrade Signs with New Fluorescent Sheeting	R22	Sideswipe
	Install Centerline Rumble Strips/Stripes	R30	Sideswipe
Intersection Countermeasures	Add Intersection Lighting at Intersections	S1/NS1	Crashes at night
	Improve Signal Hardware: Lenses, Backplates with Retroreflective Border, Mounting Size, Number	S2	Rear end
	Provide Advanced Dilemma-Zone Detection	S4	Rear end
	Install Flashing Beacons as Advance Warning	S10/NS9	Rear end
	No Right-Turn on Red	n/a	Vehicle-pedestrian, improper turning
	Convert Intersection to Roundabout	NS4/NS5	All
	Install/Upgrade Stop Signs or Intersection Warning/ Regulatory Signs	NS6	All
	Upgrade Intersection Pavement Markings	NS7	All
	Install Splitter Islands for Minor Street Approaches	NS13	Rear end
Pedestrian/Bicycle Countermeasures	Install Sidewalk/Pathway	R34PB	Vehicle-pedestrian
	Install/Upgrade Pedestrian Crossing with Enhanced Features	R35PB	Vehicle-pedestrian
	Install Raised Medians (or Refuge Islands)	NS19PB	Vehicle-pedestrian
	Install/Upgrade Pedestrian Crossing at Uncontrolled Locations (with Enhanced Safety Features)	NS21PB	Vehicle-pedestrian

Note: The ID number references the Caltrans Manual Local Road Safety

Appendix B contains the regional Countermeasures Toolbox which includes more detailed information regarding the countermeasures listed above.

The following figures and tables provide data on collision types and factors for the intersections and roadways with the highest crash scores. The locations with the highest crash scores may be top priorities for implementing countermeasures and pursuing grants. Coalinga can use the information about collision type and factors to identify potential countermeasures to apply, using the information in Table 15.

Figure 38 and Figure 39 present the top fifty priority intersections and breakdown of the top collision types and primary collision factors, respectively. Figure 40 and Figure 41 present the top priority roadways and breakdown of the top collision types and primary collision factors, respectively.



Collision Type

- Rear End
- Vehicle-Pedestrian
- Sideswipe

- City Limits
- County Boundary

0 0.6 Miles

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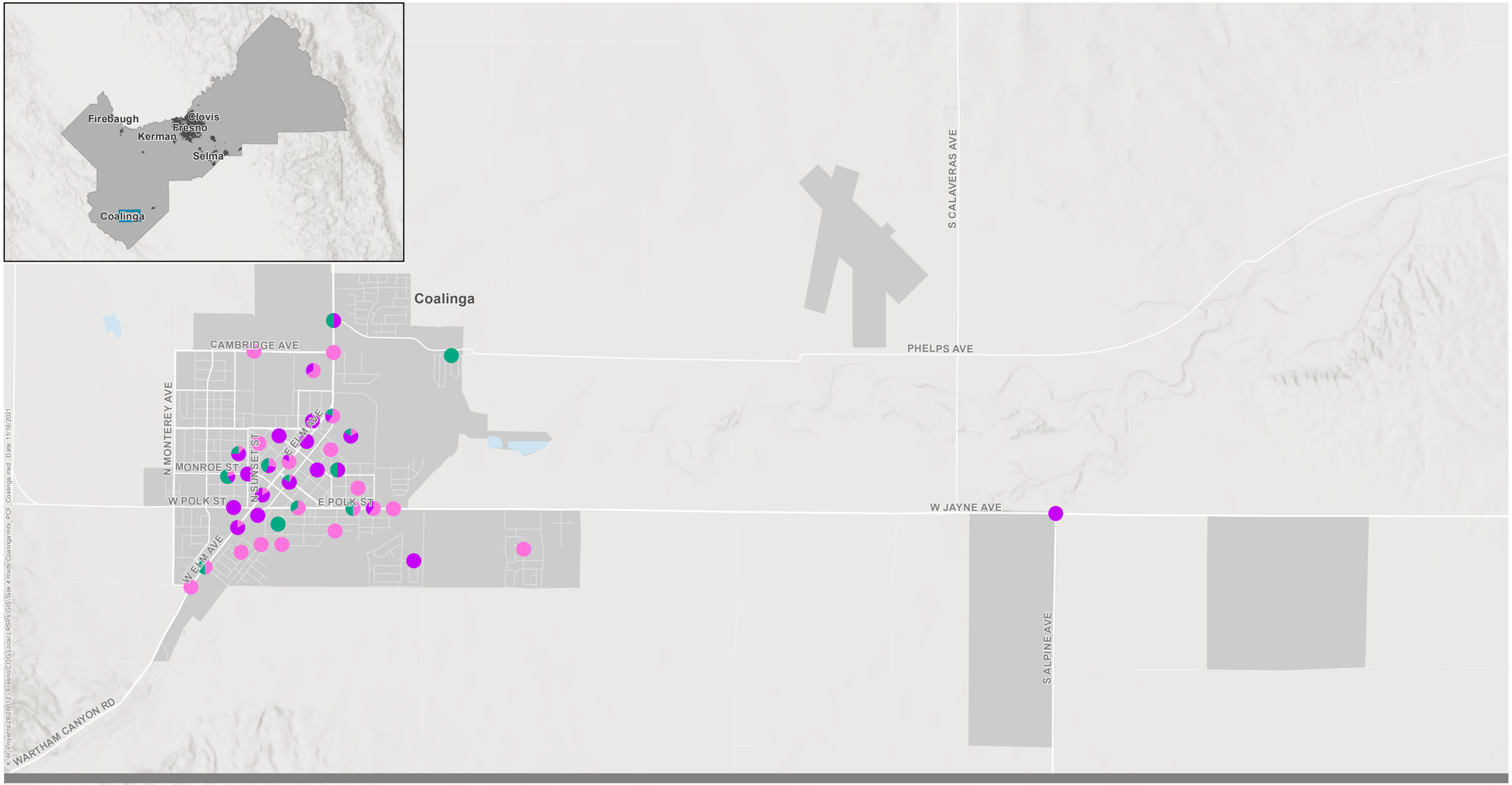
Figure 38

Top Fatal/Severe Injury Intersection Collision Types
Jurisdiction Results: Coalinga
Fresno Council of Governments



Primary Collision Factors

- Improper Turning
- Automobile Right of Way
- Unsafe Starting or Backing

- City Limits
- County Boundary

0 0.6 Miles

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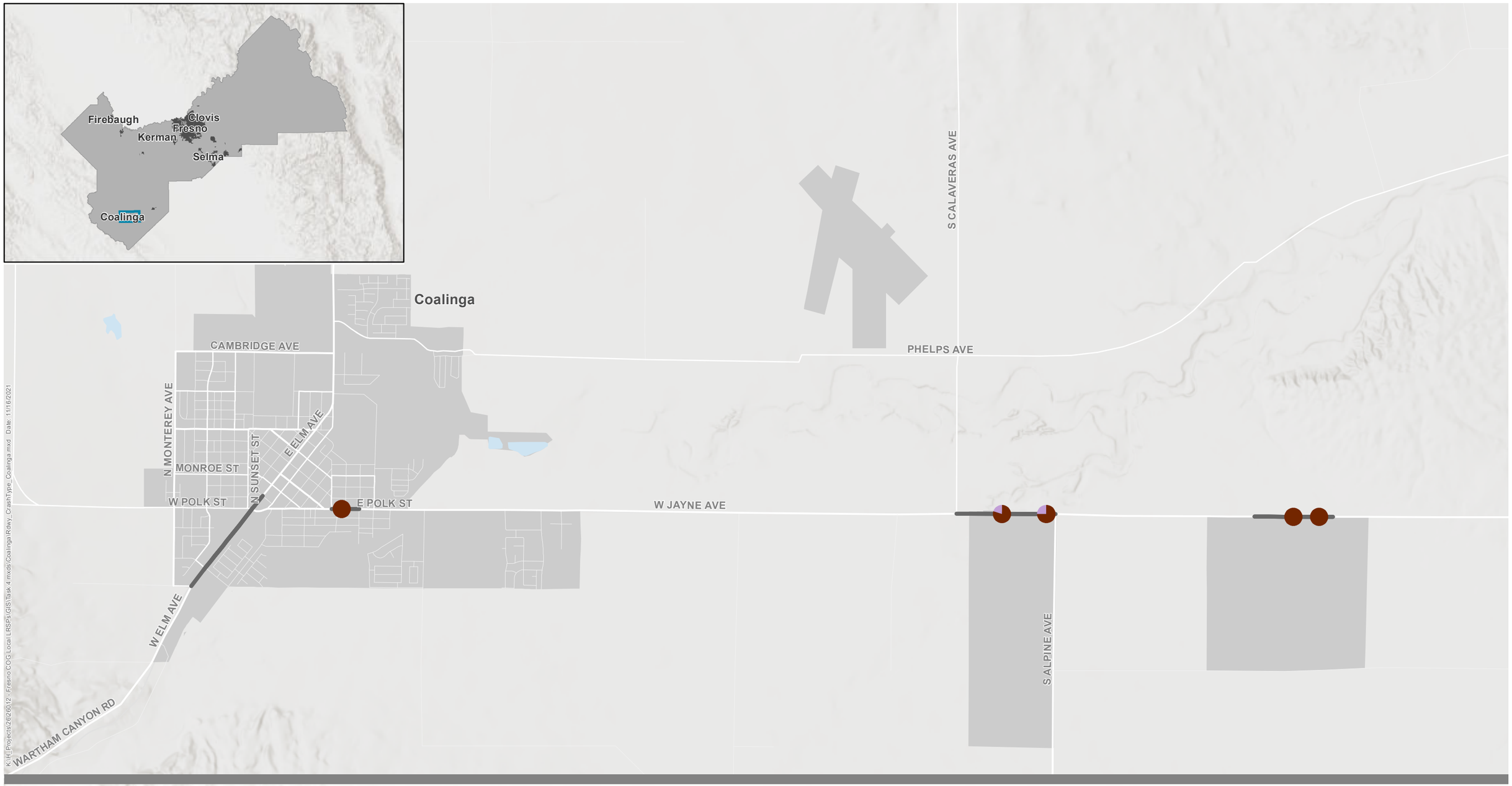
Figure 39

Top Fatal/Severe Injury Intersection Primary Collision Factors
Jurisdiction Results: Coalinga
Fresno Council of Governments



Collision Type

- Rear End
- Sideswipe
- Priority Roadways
- City Limits
- County Boundary

0 0.6 Miles

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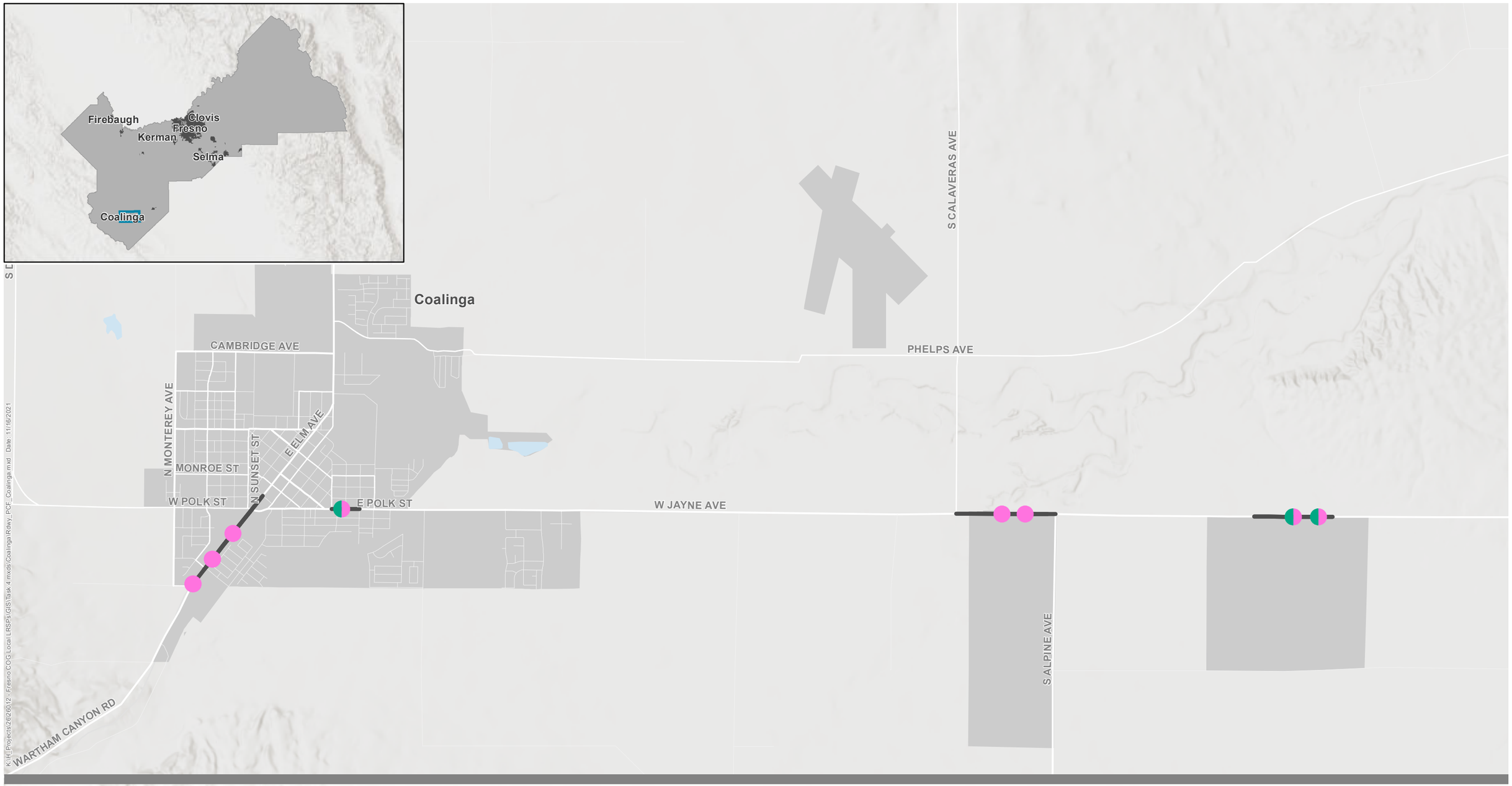
Figure 40

Top Fatal/Severe Injury Roadway Collision Types
Jurisdiction Results: Coalinga
Fresno Council of Governments



Primary Collision Factors

- Improper Turning
- Unsafe Starting or Backing
- Priority Roadways
- City Limits
- County Boundary

0 0.6 Miles

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Figure 41

Top Fatal/Severe Injury Roadway Primary Collision Factors
Jurisdiction Results: Coalinga
Fresno Council of Governments

Table 16 and Table 17 provide information for the top fifty intersection locations (based on crash severity score), including control type (signalized or unsignalized), crash severity score, and total number of crashes by collision type or primary collision factor.

Table 16. Priority Intersections with Collision Type based on Top 3 Fatal/Severe Injury Collision Types

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Collision Type			
					Rear End	Vehicle/ Pedestrian	Sideswipe	Other
1	ELM AVE & SEVENTH ST	Unsignalized	44.02	11	4	1	2	4
2	ELM AVE & FIFTH ST	Unsignalized	41.78	10	5	1	1	3
3	ELM AVE & CAMBRIDGE AVE	Unsignalized	40.58	4	2	0	1	1
4	ELM AVE & FIRST ST & VAN NESS ST	Unsignalized	39.65	9	5	0	2	2
5	LONGHOLLOW WAY & POPPY MEADOW CT	Unsignalized	38.25	2	1	0	0	1
6	DURIAN AVE & THIRD ST	Unsignalized	38.25	2	0	1	1	0
7	ELM AVE & PHELPS AVE & OIL CITY RD	Signal	27.45	9	4	0	1	4
8	FOREST AVE & FIFTH ST	Unsignalized	7.79	14	3	0	4	7
9	ELM AVE & FOURTH ST	Unsignalized	5.36	12	2	0	5	5
10	POLK ST & GARFIELD ST	Unsignalized	5.25	11	7	0	4	0
11	GLENN AVE & THIRD ST	Unsignalized	3.56	3	1	1	1	0
12	DURIAN AVE & FIFTH ST	Unsignalized	3.54	8	2	0	3	3
13	ELM AVE & THIRD ST	Unsignalized	3.43	7	4	0	2	1
14	ELM AVE & PACIFIC ST	Unsignalized	2.94	5	1	0	2	2
15	ALPINE AVE & JAYNE AVE	Unsignalized	2.94	5	0	0	1	4
16	FOREST AVE & SACRAMENTO ST	Unsignalized	2.83	4	2	0	0	2
17	POLK ST & HACHMAN ST	Unsignalized	2.83	4	2	0	1	1
18	POLK ST & SIXTH ST & HAWTHORNE AVE	Unsignalized	2.74	4	2	0	1	1
19	ELM AVE & LUCILLE AVE	Unsignalized	2.34	2	0	0	0	2
20	LOUISIANA ST & HOUSTON ST	Unsignalized	2.34	2	0	0	2	0
21	THOMPSON ST & VALLEY ST	Unsignalized	2.34	2	0	0	0	2
22	WARTHAN ST & VALLEY ST	Unsignalized	2.34	2	0	0	1	1
23	GLENN AVE & PINE ST	Unsignalized	2.34	2	1	0	0	1
24	ELM AVE & SECOND ST	Unsignalized	2.34	2	0	1	1	0
25	ELM AVE & WALNUT AVE	Unsignalized	2.22	6	2	1	1	2
26	ELM AVE & POLK ST	Signal	2.20	11	7	0	3	1
27	CHARDONNAY LN & BURGANDY WAY	Unsignalized	2.14	1	0	0	0	1
28	HALIBURTON WAY & BOARDAGARY LN	Unsignalized	2.14	1	1	0	0	0
29	COYOTE SPRINGS ST & WILLOW SPRINGS AVE	Unsignalized	2.14	1	0	1	0	0
30	LOUISIANA ST & PLEASANT ST	Unsignalized	2.14	1	1	0	0	0

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Collision Type			
					Rear End	Vehicle/ Pedestrian	Sideswipe	Other
31	ALFRED ST & POLK ST & IVY AVE	Unsignalized	2.14	1	0	1	0	0
32	MONROE ST & SUNSET ST & CEDAR AVE	Unsignalized	2.14	1	1	0	0	0
33	CEDAR AVE & THIRD ST	Unsignalized	2.14	1	0	0	1	0
34	FILLMORE ST & BAKER ST	Unsignalized	2.14	1	0	1	0	0
35	GRANT ST & CHERRY LN	Unsignalized	2.14	1	1	0	0	0
36	WALNUT AVE & MAPLE ST	Unsignalized	2.14	1	0	0	0	1
37	MEADOW ST & CAMBRIDGE AVE	Unsignalized	2.14	1	0	0	0	1
38	THOMPSON ST & POLK ST	Unsignalized	2.02	5	2	0	1	2
39	BAKER ST & TRUMAN LN	Unsignalized	2.02	5	1	0	1	3
40	ELM AVE & CHERRY LN	Unsignalized	1.82	4	3	0	0	1
41	POLK ST & CALIFORNIA ST	Unsignalized	1.62	3	0	1	0	2
42	ELM AVE & SIXTH ST	Unsignalized	1.62	3	3	0	0	0
43	WARTHAN ST & POLK ST	Unsignalized	1.42	2	0	0	2	0
44	IVY AVE & FIFTH ST	Unsignalized	1.42	2	0	1	1	0
45	ELM AVE & GRANT ST	Unsignalized	1.42	2	0	1	0	1
46	MONTEREY AVE & HARVARD AVE	Unsignalized	1.42	2	0	0	0	2
47	SUNSET ST & CAMBRIDGE AVE	Unsignalized	1.42	2	1	0	0	1
48	DURIAN AVE & SIXTH ST	Unsignalized	1.40	7	4	0	1	2
49	HALIBURTON WAY & COX LN	Unsignalized	1.22	1	0	1	0	0
50	WARTHAN ST & TACHE ST	Unsignalized	1.22	1	0	0	0	1

Note: Other crashes include all crashes that are not coded as one of the top three collision types

Table 17. Priority Intersections with Primary Collision Factor based on Top 3 Fatal/Severe Injury Primary Collision Factors

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Improper Turning	Auto ROW	Unsafe Starting or Backing	Other
1	ELM AVE & SEVENTH ST	Unsignalized	44.02	11	1	5	0	5
2	ELM AVE & FIFTH ST	Unsignalized	41.78	10	1	5	2	2
3	ELM AVE & CAMBRIDGE AVE	Unsignalized	40.58	4	2	0	0	2
4	ELM AVE & FIRST ST & VAN NESS ST	Unsignalized	39.65	9	1	4	1	3
5	LONGHOLLOW WAY & POPPY MEADOW CT	Unsignalized	38.25	2	1	0	0	1
6	DURIAN AVE & THIRD ST	Unsignalized	38.25	2	1	0	0	1
7	ELM AVE & PHELPS AVE & OIL CITY RD	Signal	27.45	9	0	1	1	7
8	FOREST AVE & FIFTH ST	Unsignalized	7.79	14	1	9	2	2
9	ELM AVE & FOURTH ST	Unsignalized	5.36	12	5	1	0	6
10	POLK ST & GARFIELD ST	Unsignalized	5.25	11	3	2	0	6

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Improper Turning	Auto ROW	Unsafe Starting or Backing	Other
11	GLENN AVE & THIRD ST	Unsignalized	3.56	3	0	2	0	1
12	DURIAN AVE & FIFTH ST	Unsignalized	3.54	8	2	2	3	1
13	ELM AVE & THIRD ST	Unsignalized	3.43	7	0	2	2	3
14	ELM AVE & PACIFIC ST	Unsignalized	2.94	5	2	0	2	1
15	ALPINE AVE & JAYNE AVE	Unsignalized	2.94	5	0	3	0	2
16	FOREST AVE & SACRAMENTO ST	Unsignalized	2.83	4	2	0	0	2
17	POLK ST & HACHMAN ST	Unsignalized	2.83	4	1	0	1	2
18	POLK ST & SIXTH ST & HAWTHORNE AVE	Unsignalized	2.74	4	2	0	1	1
19	ELM AVE & LUCILLE AVE	Unsignalized	2.34	2	2	0	0	0
20	LOUISIANA ST & HOUSTON ST	Unsignalized	2.34	2	1	0	0	1
21	THOMPSON ST & VALLEY ST	Unsignalized	2.34	2	0	0	0	2
22	WARTHAN ST & VALLEY ST	Unsignalized	2.34	2	1	0	0	1
23	GLENN AVE & PINE ST	Unsignalized	2.34	2	1	0	0	1
24	ELM AVE & SECOND ST	Unsignalized	2.34	2	0	1	0	1
25	ELM AVE & WALNUT AVE	Unsignalized	2.22	6	2	1	0	3
26	ELM AVE & POLK ST	Signal	2.20	11	1	5	0	5
27	CHARDONNAY LN & BURGANDY WAY	Unsignalized	2.14	1	0	1	0	0
28	HALIBURTON WAY & BOARDAGARY LN	Unsignalized	2.14	1	1	0	0	0
29	COYOTE SPRINGS ST & WILLOW SPRINGS AVE	Unsignalized	2.14	1	0	0	0	1
30	LOUISIANA ST & PLEASANT ST	Unsignalized	2.14	1	0	0	1	0
31	ALFRED ST & POLK ST & IVY AVE	Unsignalized	2.14	1	0	0	0	1
32	MONROE ST & SUNSET ST & CEDAR AVE	Unsignalized	2.14	1	0	1	0	0
33	CEDAR AVE & THIRD ST	Unsignalized	2.14	1	0	1	0	0
34	FILLMORE ST & BAKER ST	Unsignalized	2.14	1	0	0	0	1
35	GRANT ST & CHERRY LN	Unsignalized	2.14	1	0	0	0	1
36	WALNUT AVE & MAPLE ST	Unsignalized	2.14	1	0	0	0	1
37	MEADOW ST & CAMBRIDGE AVE	Unsignalized	2.14	1	0	0	1	0
38	THOMPSON ST & POLK ST	Unsignalized	2.02	5	2	0	0	3
39	BAKER ST & TRUMAN LN	Unsignalized	2.02	5	3	1	1	0
40	ELM AVE & CHERRY LN	Unsignalized	1.82	4	0	0	0	4
41	POLK ST & CALIFORNIA ST	Unsignalized	1.62	3	0	1	0	2
42	ELM AVE & SIXTH ST	Unsignalized	1.62	3	0	2	0	1
43	WARTHAN ST & POLK ST	Unsignalized	1.42	2	0	0	0	2
44	IVY AVE & FIFTH ST	Unsignalized	1.42	2	0	0	0	2
45	ELM AVE & GRANT ST	Unsignalized	1.42	2	0	1	0	1

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Improper Turning	Auto ROW	Unsafe Starting or Backing	Other
46	MONTEREY AVE & HARVARD AVE	Unsignalized	1.42	2	0	0	0	2
47	SUNSET ST & CAMBRIDGE AVE	Unsignalized	1.42	2	1	0	0	1
48	DURIAN AVE & SIXTH ST	Unsignalized	1.40	7	1	1	3	2
49	HALIBURTON WAY & COX LN	Unsignalized	1.22	1	0	0	0	1
50	WARTHAN ST & TACHE ST	Unsignalized	1.22	1	1	0	0	0

Note: Other crashes include all crashes that are not coded as one of the top three primary collision factors

Table 18 and Table 19 provide information for the top eight roadway segments (based on crash severity score), including roadway classification, crash severity score, and total number of crashes by collision type or primary collision factor.

Table 18. Priority Roadways Segments with Collision Type based on Top 3 Fatal/Severe Injury Collision Types

#	Location	Classification	Crash Severity Score	Total Number of Crashes	Collision Type			
					Rear End	Vehicle/ Pedestrian	Side-swipe	Other
1	E Polk St (N Hayes St to N Pine St)	Arterial/Collector	35.27	3	2	0	0	1
2	E Polk St (S Warthan St to S Hachman St)	Arterial/Collector	35.27	3	2	0	0	1
3	W Elm Ave (N 7th St to Cheney Ln)	Arterial/Collector	33.33	3	0	0	0	3
4	W Elm St (W Polk St to Pacific St)	Arterial/Collector	33.33	3	0	0	0	3
5	W Elm St (W Pleasant St to W Lucille Ave)	Arterial/Collector	32.93	1	0	0	0	1
6	W Jayne Ave (S Calaveras Ave to west of S Alpine Ave)	Arterial/Collector	6.47	12	8	0	2	2
7	W Jayne Ave (east of S Calaveras Ave to S Alpine Ave)	Arterial/Collector	6.47	12	8	0	2	2
8	W Jayne Ave (east of S Alpine Ave to west of S El Dorado Ave)	Arterial/Collector	5.77	9	5	0	0	4

Note: Other crashes include all crashes that are not coded as one of the top three collision types

Table 19. Priority Roadways Segments with Primary Collision Factors based on Top 3 Fatal/Severe Injury Primary Collision Factors

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Improper Turning	Auto Right of Way	Unsafe Starting or Backing	Other
1	E Polk St (N Hayes St to N Pine St)	Arterial/Collector	35.27	3	1	0	1	1
2	E Polk St (S Warthan St to S Hachman St)	Arterial/Collector	35.27	3	1	0	1	1
3	W Elm Ave (N 7th St to Cheney Ln)	Arterial/Collector	33.33	3	3	0	0	0

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Improper Turning	Auto Right of Way	Unsafe Starting or Backing	Other
4	W Elm St (W Polk St to Pacific St)	Arterial/Collector	33.33	3	3	0	0	0
5	W Elm St (W Pleasant St to W Lucille Ave)	Arterial/Collector	32.93	1	1	0	0	0
6	W Jayne Ave (S Calaveras Ave to west of S Alpine Ave)	Arterial/Collector	6.47	12	3	0	0	9
7	W Jayne Ave (east of S Calaveras Ave to S Alpine Ave)	Arterial/Collector	6.47	12	3	0	0	9
8	W Jayne Ave (east of S Alpine Ave to west of S El Dorado Ave)	Arterial/Collector	5.77	9	1	0	1	7

Note: Other crashes include all crashes that are not coded as one of the top three primary collision factors

Education Strategies

Education strategies for Coalinga are targeted at unsafe speed, distracted driving, and pedestrian awareness. Unsafe speed was the primary collision factor in one of the nine severe injury crashes and the primary collision factor in 21 crashes overall. One of the highest complaints from the City's call-in line is speeding in neighborhoods. In the stakeholder focus groups, distracted driving was noted as a large issue, even if it did not show up in the crash data. Pedestrian crashes are an emphasis area, given the overrepresentation of pedestrians in fatal and severe crashes.

The Safe Roads Save Lives campaign is a marketing effort led by the Fresno COG, with the goals of:

- Educate all road users on safe transportation behaviors
- Increase safety for people walking and biking
- Highlight behaviors that cause the most crashes in Fresno County—speeding and distracted driving

The campaign Includes branding, social media strategies, print materials, radio and video resources, school resources, and a campaign website. Coalinga may find these materials helpful, especially those related to speeding, distracted driving, and watching out for pedestrians.

The following activities are recommended for Coalinga as they move forward on implementing the Safe Roads Save Lives campaign:

- Identify staff appropriate to attend a presentation by Fresno COG staff about the Safe Roads Save Lives campaign. Appropriate staff members include staff associated with transportation engineering and planning, communications, traffic enforcement, school transportation, and other jurisdictional staff who work with the roadway system.

- Work with school districts to distribute print materials and offer school-related transportation resources. Ensure that school communications are in both English and Spanish.
- Work with public information or communications staff to spread Safe Roads Save Lives materials throughout Coalinga through the following channels:
    - Repost and link to Fresno COG posts that refer to the Safe Roads Save Lives campaign.
    - Have print materials (flyers, bumper stickers, pins, and postcards) available at events and community festivals.
    - Print posters for posting at governmental buildings such as City Hall, libraries, DMVs, and other facilities that the public regularly uses.
    - Work with the Fresno COG to identify a radio station to air a Safe Roads Save Lives radio public service announcement (PSA).
    - Have a direct link to Safe Roads Save Lives campaign website from the city website.

Emergency Services

Emergency service organizations depend on safe roadways and efficient communication processes to reach and effectively respond to emergencies. Each type of emergency services organization that serves Coalinga – law enforcement, fire, emergency medical services (EMS), California Highway Patrol – work independently and collaboratively to develop procedures that allow them to respond to incidents in their own jurisdictions as well as support others as needed. The following recommendations may help improve emergency services response as the various organizations update procedures and policies and continue to partner on roadway safety efforts:

- All roadway safety projects should be vetted by emergency service organizations to ensure that their design does not hamper access.
- As new emergency service and response procedures are developed, roadway safety improvement opportunities should be identified and implications of changes to response times should be considered.
- Coalinga staff should participate in periodic coordination calls between emergency response agencies to gather and share recent observations about crashes and hot spots, to understand emergent safety issues that may not have led to policy reports or yet be available through statewide crash reporting systems.

Enforcement

Enforcement strategies can include programs or campaigns specifically focused on changing road user behavior through more visible and active enforcement of existing traffic laws, as well as focusing enforcement in areas that have historically been shown to have higher-than-average crash rates. Typically, the effectiveness of enforcement strategies is temporal, meaning they are effective at changing behavior for a discrete period of time – during and shortly after the increased enforcement activities.

The following enforcement strategies should be considered for Coalinga:

- Schedule heightened speed (or other behavior) enforcement checks during strategic times of the year, such as when students return to school or the beginning of fog season. Coalinga currently conducts heightened enforcement events and has found them effective.
- Focus speed enforcement efforts in locations with high crash rates.
- Use automatic enforcement, such as red-light cameras or speed feedback signs, especially in school zones. Coalinga does have traffic cameras with license plate readers it can use.
- Deploy speed feedback signs in areas with high crash rates or speeding citations.

The effectiveness of each strategy should be measured and evaluated, considering the number of staff hours and amount of resources needed. The results should be reviewed and used to refine future enforcement activities.

Enforcement strategies should be undertaken with due caution to avoid inequitable enforcement activities and evaluated to determine the strategy's impact. More details about equitable enforcement can be found on page 8 (Introduction).

EVALUATION AND IMPLEMENTATION

A key part of achieving the City's vision is consistently evaluating roadway safety performance and tracking progress towards the City's goals. The City will develop a process to regularly collect data and information around the performance measures that can be used to assess changes city-wide and at the top priority locations.

As feasible, it is recommended that the City of Coalinga update this LRSP every three to five years using updated crash data and the performance measures. Comparing the performance measures related to investments made with the crash data should provide a clear indication of the impact of the City's and safety partner's efforts. Future LRSPs may provide new emphasis areas and top priority locations that reflect progress made and new priorities based on trends in the data.

Activities for implementing the plan include:

- Identifying countermeasures and strategies for priority locations based on the crash data.
- Utilizing the Fresno COG Regional Safety Plan to implement regional strategies and share best practices.
- Exploring funding opportunities to implement priority strategies.
- Identifying key staff and activities to support the regional Safe Roads Save Lives campaign.
- Identifying enforcement strategies to implement and evaluate.
- Regularly coordinating with safety partner agencies to assess progress, identify opportunities to implement countermeasures and strategies, and identify opportunities for citizen involvement.
- Regularly collecting and organizing data to support evaluation of the LRSP.

4.0 CITY OF FIREBAUGH

The City of FIrebaugh has an approximate population of 7,980.[21] The average daily vehicle miles traveled is 33,939, and the City maintains approximately 22 total roadway centerline miles. The main arterial roadways that connect the City to other jurisdictions include N Street, which runs northwest to southeast, 12th Street/W Nees Avenue, which runs west from N Street, and 13th Street, which runs east from N Street. Based on the review of crash data conducted as part of the LRSP, pedestrians are overrepresented in fatal and severe injury crashes. The three collision types reported in fatal and severe injury crashes were **vehicle-pedestrian**, **head on**, and **hit object** crashes. The primary collision factors reported for fatal and severe injury crashes include **pedestrian violation** and **other improper driving.** Among all reported crashes, the most commonly reported primary collision factor is **automobile right of way**. High priority countermeasures to address these collision types and primary collision factors are shown in Table 23. The LRSP provides potential engineering, education, emergency services, and enforcement strategies tailored to Firebaugh's crash history and local priorities, as well as performance measures to evaluate progress.

VISION AND GOALS

The City's vision for roadway safety is:

Create a roadway network that provides a comfortable environment for all modes of transportation within the City.

The City's goals in support of the vision are:

1. Have zero fatal and severe injury crashes on the City roadways by 2026.
2. Systemically implement safety countermeasures proven to reduce fatal and severe crashes across the City's public roadways.
3. Enhance pedestrian facilities and crossings within the City limits and collaborate with Caltrans on modifications proposed to state route roadways within the City limits.
4. Participate in regional activities to promote roadway safety as a priority investment.

[21] 2018 population. Source: California Department of Finance

SAFETY PARTNERS

A variety of agency staff and community partners were involved throughout the development of this LRSP and played an integral role in identifying priorities, providing local context, and reviewing the existing conditions analysis. Many of the strategies identified in this plan will require coordination with these partners and their support of the City's effort to create a culture of roadway safety. Firebaugh's goals reflect the importance of participating in regional activities to promote roadway safety. While additional partners may be identified in the future, those involved in development of the LRSP include:

- Firebaugh Fire Department
- Firebaugh Police Department
- Firebaugh Public Works Department
- Firebaugh-Las Deltas Unified School District
- Fresno Council of Governments

PERFORMANCE MEASURES

Performance measures are used to track progress and a key element of making data-informed decisions. Performance measures that support the City's vision, goals, and emphasis areas include:

- Annual number of crashes (city-wide and at each of the top twenty priority locations)
- Annual number of fatal and severe injury crashes (city-wide and at each of the top twenty priority locations)
- Annual number of pedestrian and bicycle crashes (city-wide and at each of the top twenty priority locations)
- Annual number of head on crashes (city-wide)
- Annual number of hit object crashes (city-wide)
- Annual number of crashes at intersections (city-wide)
- Investments made in roadway safety countermeasures (e.g. dollars spent, grants pursued, partnerships developed)
- Investments made in education and enforcement strategies (e.g. dollars spent, grants pursued, partnerships developed)
- Coordination with other local agencies and/or safety partners (e.g. meetings held, projects pursued)
- Coordination on crash data processes and reporting (e.g. meetings held, changes made)

As part of plan implementation, the City will identify a process for annually tracking these performance measures to support future updates to this roadway safety plan.

DATA SUMMARY

The primary data sets used to inform the technical analyses for the City's local road safety plan were crash data and roadway network information. As noted below, future updates could incorporate traffic volume data if widely available for locations across the City. In addition, feedback from a publicly available survey was documented for consideration in identifying issues and improvement strategies.

Public Survey Feedback

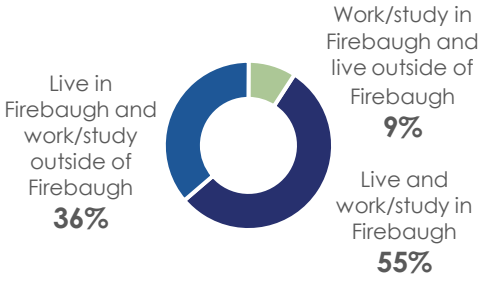
Toole Design Group worked with Fresno COG to develop an online survey and interactive webmap to provide the opportunity for public engagement on the LRSP. The goal was to collect both general and geographically specific feedback on safety problems, desired safety improvements in jurisdictions that are part of the MLRSP, as well as voluntary demographic information for Title IV reporting. Both activities were open from August 16, 2021 to September 20, 2021 and sought public feedback on spatial patterns of traffic safety concerns and desired improvements.

As the primary open public engagement opportunity during MLRSP development, the survey and interactive webmap served a crucial role in illuminating the community's traffic safety concerns and desired traffic safety improvements. Below is a summary of key findings from the online survey and interactive webmap specific to Firebaugh. More information on the methodology and overall findings of the survey are provided in *Appendix A*.

11
PEOPLE RESPONDED

2
LOCATIONS IDENTIFIED

WHERE PARTICIPANTS WORK AND LIVE



MOST COMMON SAFETY CONCERNS

- Speeding or aggressive driving
- Crashes or near misses happen here
- Lack of safe places to walk, bike, or wait for the bus

- The survey asked respondents to provide input on the top road safety improvements needed in their communities. While the survey prompted participants to pick three improvements, some selected more than three responses. A total of 35 responses were received for Firebaugh from 11 participants, with the most common desired improvement types including:
    - Maintenance of existing roads and streets (7 responses)

  - Pedestrian crossing improvements (5 responses)
  - Traffic signals (5 responses)
  - Rural road improvements to prevent run-off-road crashes (4 responses)
  - Speed enforcement (4 responses)
- Participants dropped points in the webmap in specific locations across Fresno County where they experienced road safety concerns. When leaving a point, participants could select from a list of traffic safety concerns and the kinds of travel impacted, with the ability to select as many responses as applicable. A text box gave participants the option to note what they think would make the location safer. A total of 2 locations were noted in Firebaugh, noting the following traffic safety concerns:
  - Speeding or aggressive driving (2 responses)
  - Crashes or near misses happen here (1 response)
  - Lack of safe places to walk, bike, or wait for the bus (1 response)
- The survey asked participants where they live and work or study, with the option to select from a list of jurisdictions or outside of Fresno County. The participants who selected Firebaugh included:
  - 6 who live and work/study in Firebaugh
  - 4 who live in Firebaugh and work/study outside of Firebaugh
  - 1 who works/studies in Firebaugh and lives outside of Firebaugh

Crash Data

Kittelson worked with Fresno COG to assemble crash data for the City of Firebaugh using the Statewide Integrated Traffic Records System (SWITRS) database, supplemented with location information from the Transportation Injury Mapping System (TIMS) database maintained by SafeTREC at the University of California, Berkeley. Throughout this report, crashes are associated with a jurisdiction based on the reporting officer's assessment of location.

The crash database represents the time period from January 1, 2015 through December 31, 2019 and includes reported crashes that occurred on public streets. Within the assembled regional crash database, a total of 130 reported crashes are located in City of Firebaugh. Crash severity is coded according to the highest degree of injury exhibited, and the data used for this analysis includes the following coded severity levels (listed in descending order):

- Fatal: death from injuries sustained in the crash.
- Severe Injury: Injuries include, for example, broken bones, severe lacerations, or other injuries that go beyond the reporting officer's assessment of "other visible injuries."
- Other visible injury: An injury, other than those described above, that is evident to observers at the scene of the crash. For example, bruises or minor lacerations.

- Complaint of pain: Internal or other non-visible injuries. For example, a person limps or seems incoherent.
- Property damage only (PDO): No injuries sustained.

Roadway Network Data

Kittelson developed a linear referencing system of all public roadways using the Fresno County roadway centerline file. This dataset was updated to develop a measurement system based on the total road length (as determined by roadway name) to locate crashes to a specific mile point along the network. The master roadway network for the County was used to spatially analyze and prioritize specific locations within each local jurisdiction.

Traffic Volume Data

Traffic volume data was not consistently available at a sufficient level to be able to incorporate into the safety analysis. Future updates to the City's local road safety plan could incorporate traffic volume data, if available, to understand how crash frequency, severity, and type vary at different levels of traffic.

EXISTING ROADWAY SAFETY PERFORMANCE

The findings in this section are based on the crash database, which includes reported crashes from January 1, 2015 through December 31, 2019. It is organized as follows:

- All Road Users
  - Severity by Road User
  - Year, Month, and Weather
  - Collision Type
  - Location, Collision Type, and Severity
  - Primary Collision Factor
  - Lighting
  - Time of Day
- Pedestrian-involved Crashes
  - Year and Month
  - Pedestrian Action and Location
  - Lighting
- Bicyclist-involved Crashes
  - Collision Type
  - Primary Collision Factor
  - Lighting

All Road Users

This section includes analysis and findings for all reported crashes. Subsequent sections focus exclusively on crashes involving pedestrians and bicyclists.

SEVERITY BY ROAD USER

Table 20 presents reported crashes, organized by severity level and road user.

- There were seven reported pedestrian crashes, of which three were fatal.
- There was one reported bicycle crash in the City of Firebaugh.
- Most reported crashes were property damage only (PDO)—75 percent of total reported crashes.

Table 20: Crash Severity by Road User Involved

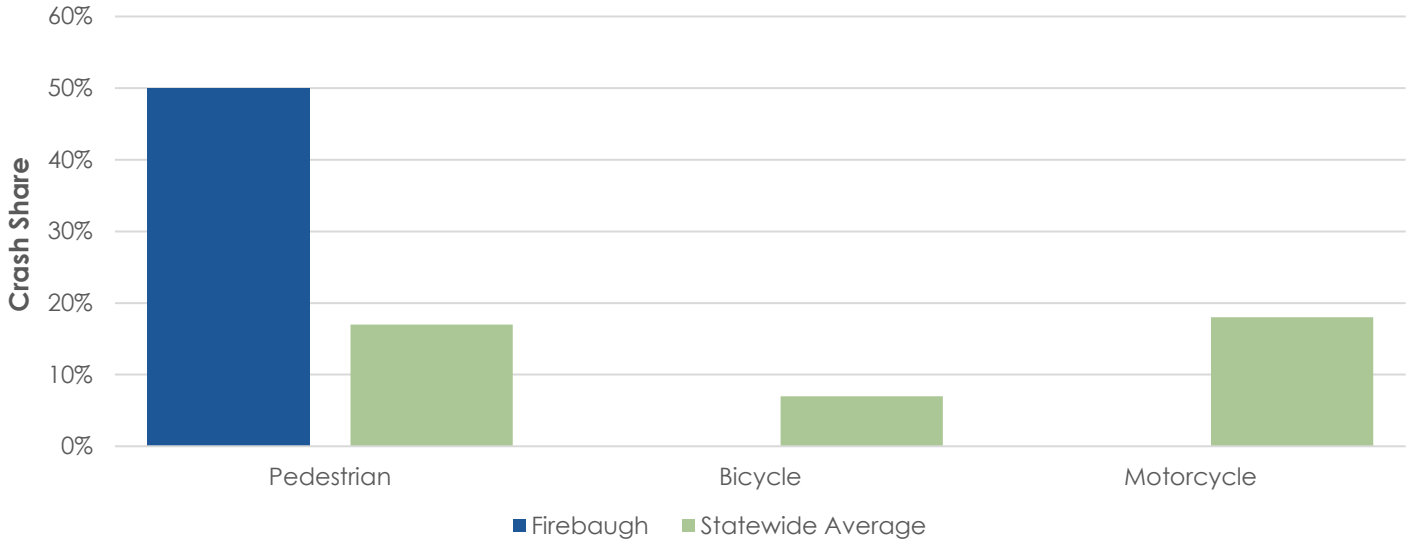
Road Users Involved	Fatal (% of column)	Severe Injury (% of column)	Visible Injury (% of column)	Complaint of Pain (% of column)	Property Damage Only (% of column)	Total (% of column)
Pedestrian Involved	3 (75%)	0 (0%)	1 (11%)	2 (11%)	1 (1%)	7 (5%)
Bicycle Involved	0 (0%)	0 (0%)	0 (0%)	1 (6%)	0 (0%)	1 (1%)
Vehicle Only or Vehicle-Fixed Object	1 (25%)	2 (100%)	8 (89%)	15 (83%)	96 (99%)	122 (94%)
Reported Crashes	4 (100%)	2 (100%)	9 (100%)	18 (100%)	97 (100%)	130 (100%)
Severity Share of Reported Crashes	3%	2%	7%	14%	75%	100%

Source: SWITRS, TIMS, Kittelson, 2021.

California's Strategic Highway Safety Plan (SHSP) includes 16 challenge areas to focus statewide resources and efforts. Three such challenge areas were crashes involving pedestrians, bicyclists, and motorcyclists. The SHSP analyzed the share of fatal and severe injury crashes involving each of these road users. Figure 42 compares crash trends in the City of Firebaugh to the statewide trends reported in the SHSP.

- City of Firebaugh has one reported bicycle crash reported as a "complaint of pain" and no reported motorcycle crashes.
- Pedestrian crashes represent three of six fatal/severe injury crashes (50 percent) in Firebaugh, a higher share than the statewide average reflected in the SHSP.

Figure 42: Fatal and Severe Injury Crash Shares by Road User Compared to Statewide Trends

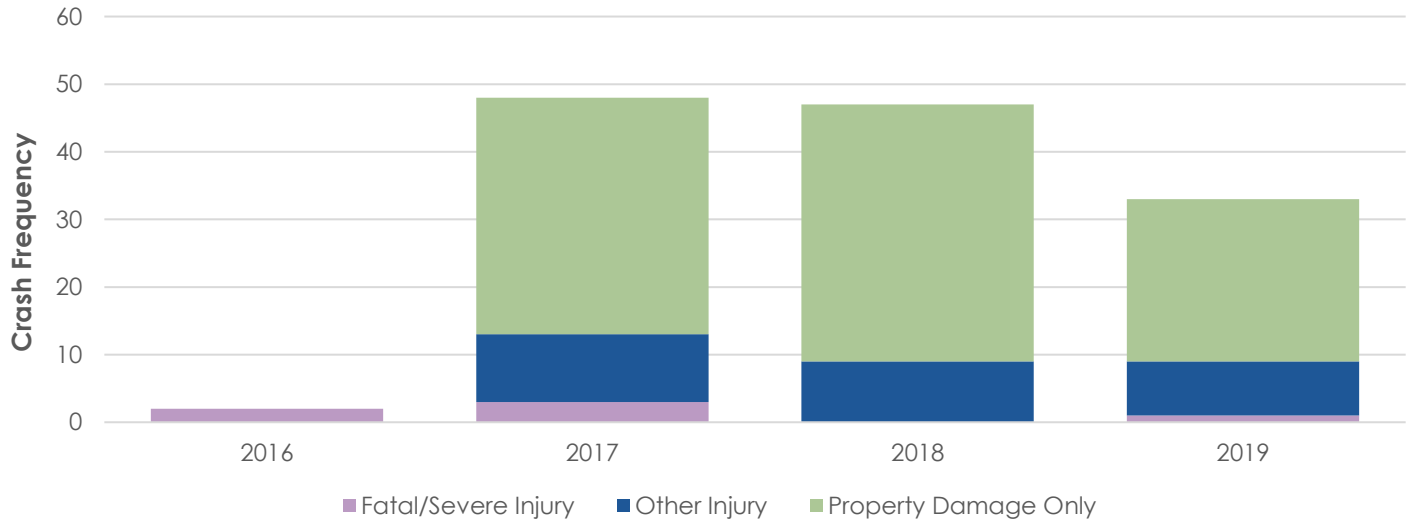


Source: SHSP, SWITRS, TIMS, Kittelson, 2021.

YEAR, MONTH, AND WEATHER

Figure 43 shows year-over-year trends in the data by severity. There are no reported crashes in the data for the year 2015 and two fatal/severe crashes reported for the year of 2016. From the years 2017 to 2019 the average annual number is 26 crashes a year. There appears to be a downward trend in reported crashes between 2017 and 2019. A lack of reporting could contribute to the absence of crashes for analysis in 2015 and the count observed in 2016 (as well the totals in the other years shown).

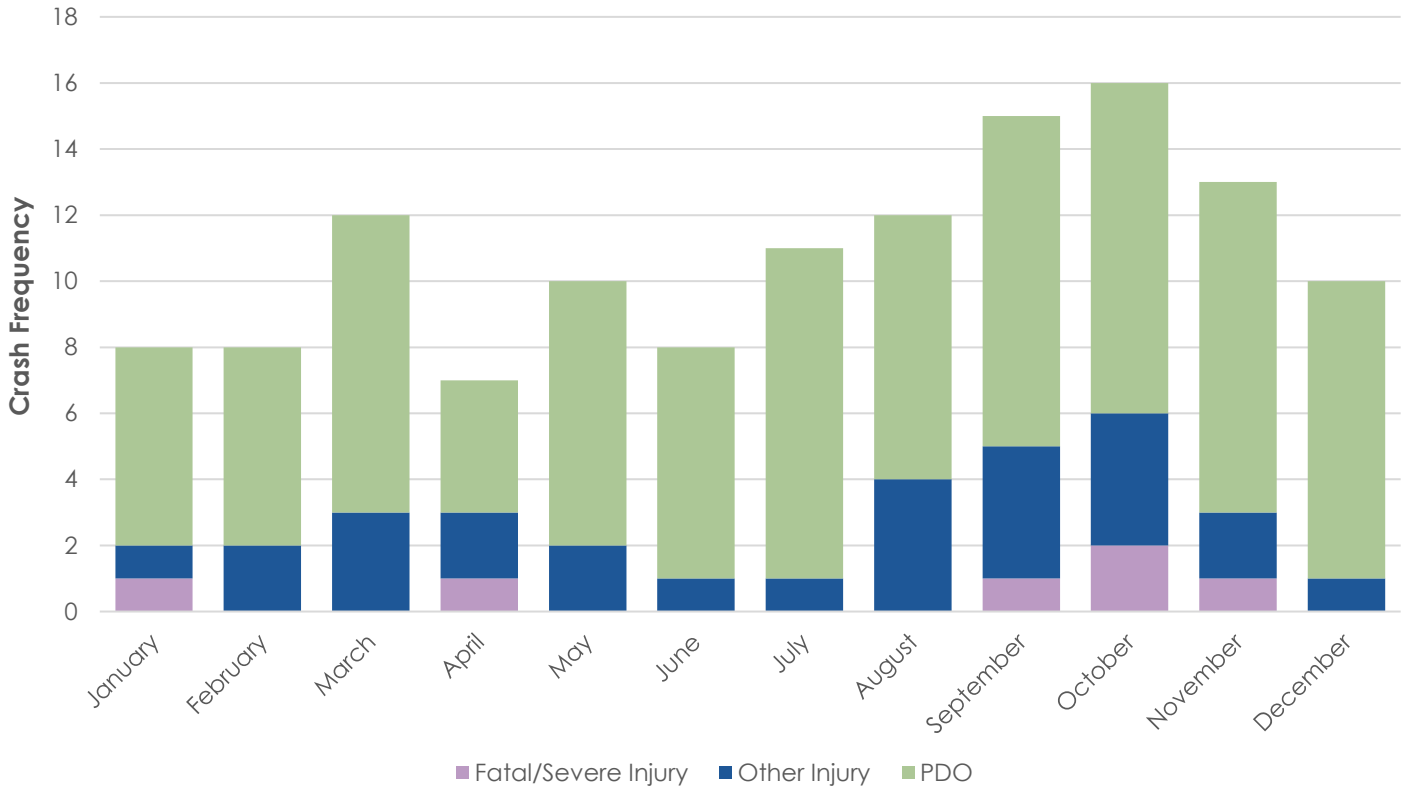
Figure 43: Year-over-Year Trends in Crash Data by Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes.

Figure 44 presents the total crashes by month and severity for the crash database. On average, 12 crashes occurred per month. Fluctuations from a single month to the next tend to represent the degree of randomness in crash occurrence and are not necessarily indicative of an overall trend. The number of crashes in September, October, and November each exceed the monthly average.

Figure 44: Crashes by Month and Severity

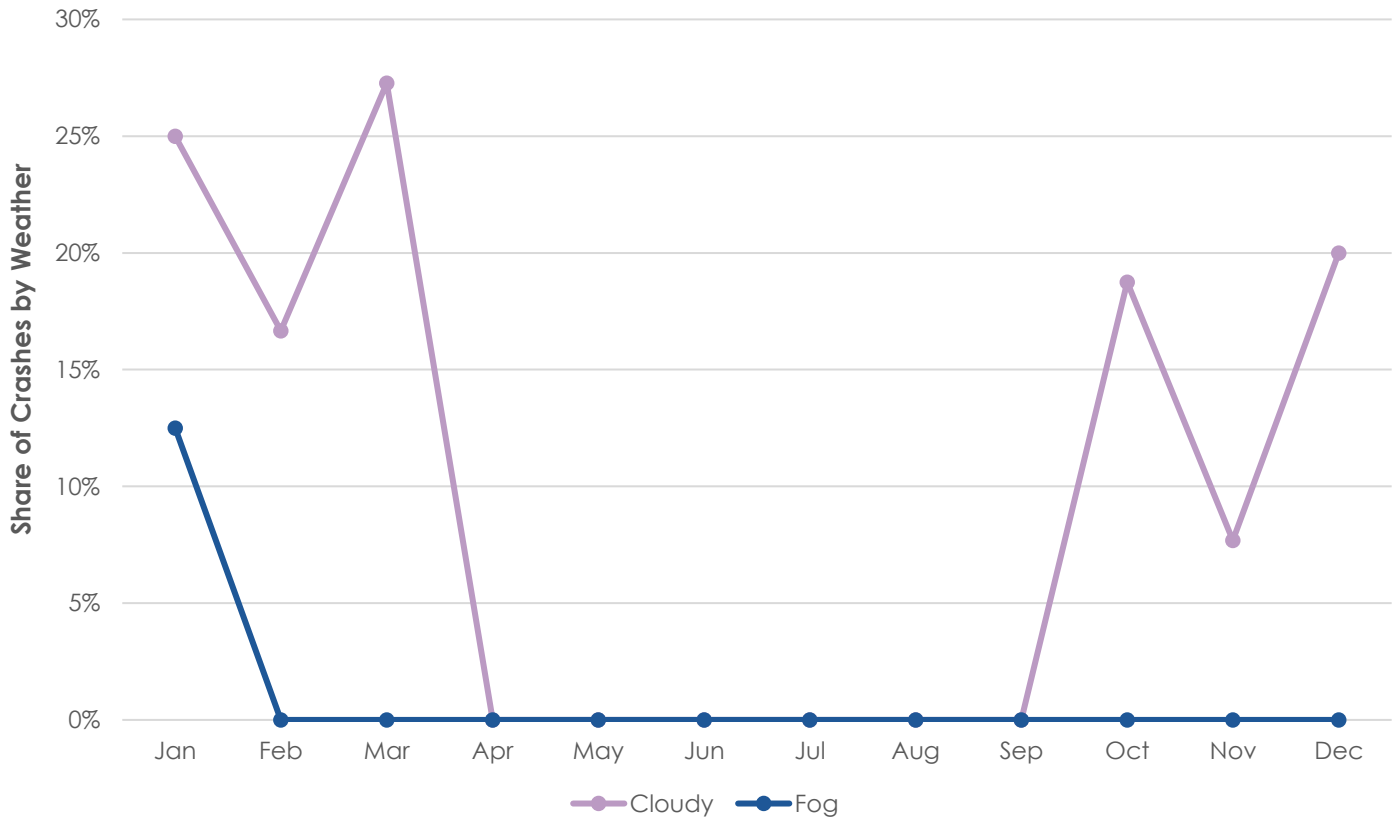


Source: SWITRS, TIMS, Kittelson, 2021
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

Figure 45 illustrates crashes by month and weather conditions. The most common weather condition, clear weather, is not shown in the chart below to highlight weather's factor on crash trends.

- One crash was recorded to have occurred in foggy conditions, in January.
- Crashes occurring in cloudy conditions peak between October and March (peaking at three crashes, or 27 percent of crashes in March) and are lowest during the months of April to September.
- No reported crashes occurred during rainy conditions.

Figure 45: Crashes by Month and Weather Condition



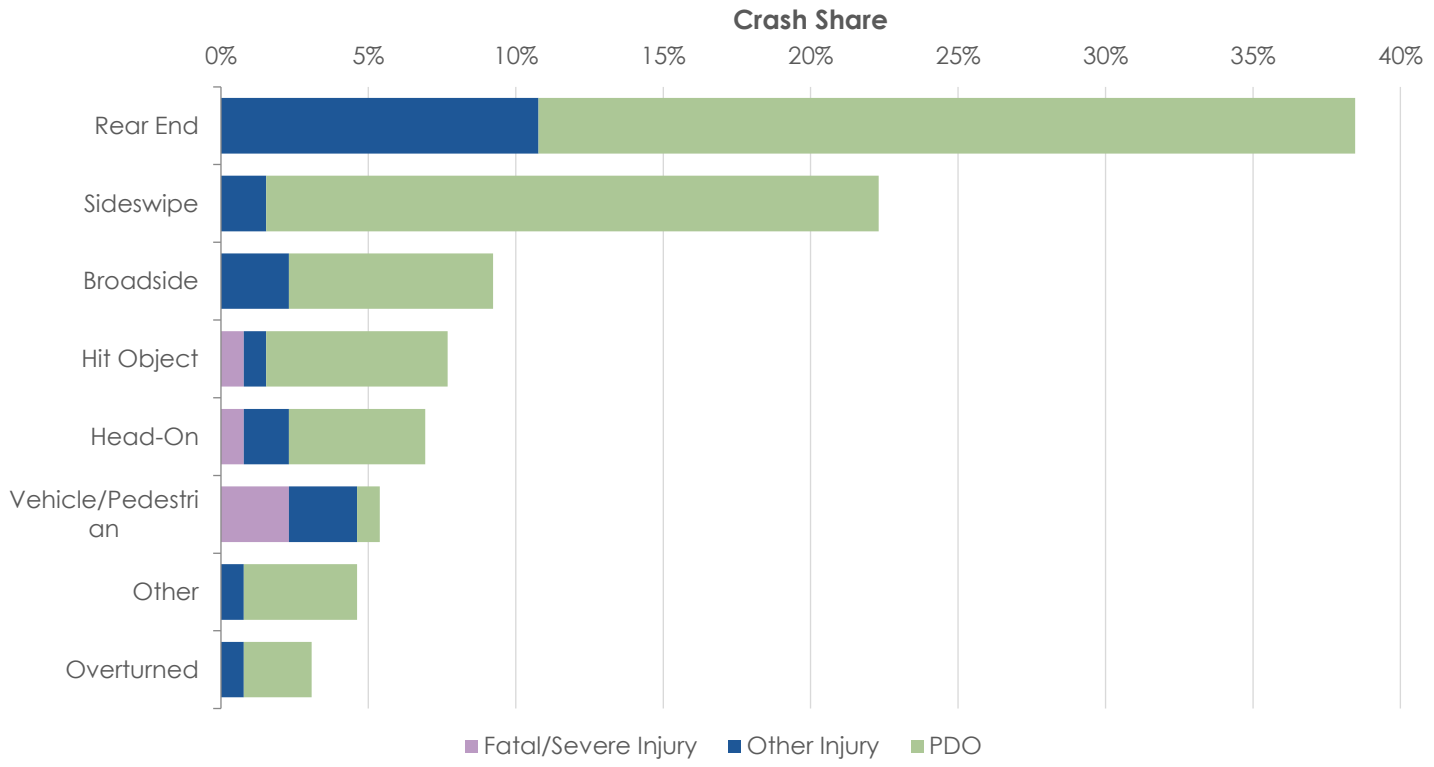
Source: SWITRS, TIMS, Kittelson, 2021
Note: Only select conditions shown to improve legibility for less frequent weather conditions.

COLLISION TYPE

Reported collision type gives an indication of the movements most frequently involved in crashes and in severe outcomes. Figure 46 presents crashes by type and severity.

- Among total reported crashes, the top three most frequent collision types are **rear end** (38 percent), **sideswipe** (22 percent), and **broadside** (9 percent). These three collision types account for 69 percent of reported crashes in the City.
- Among fatal and severe injury crashes, three are **vehicle/pedestrian** crashes (three of six for 50 percent).[22] Among the remaining three, one each was **head on**, **hit object**, and not stated.

Figure 46: Crashes by Collision Type and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

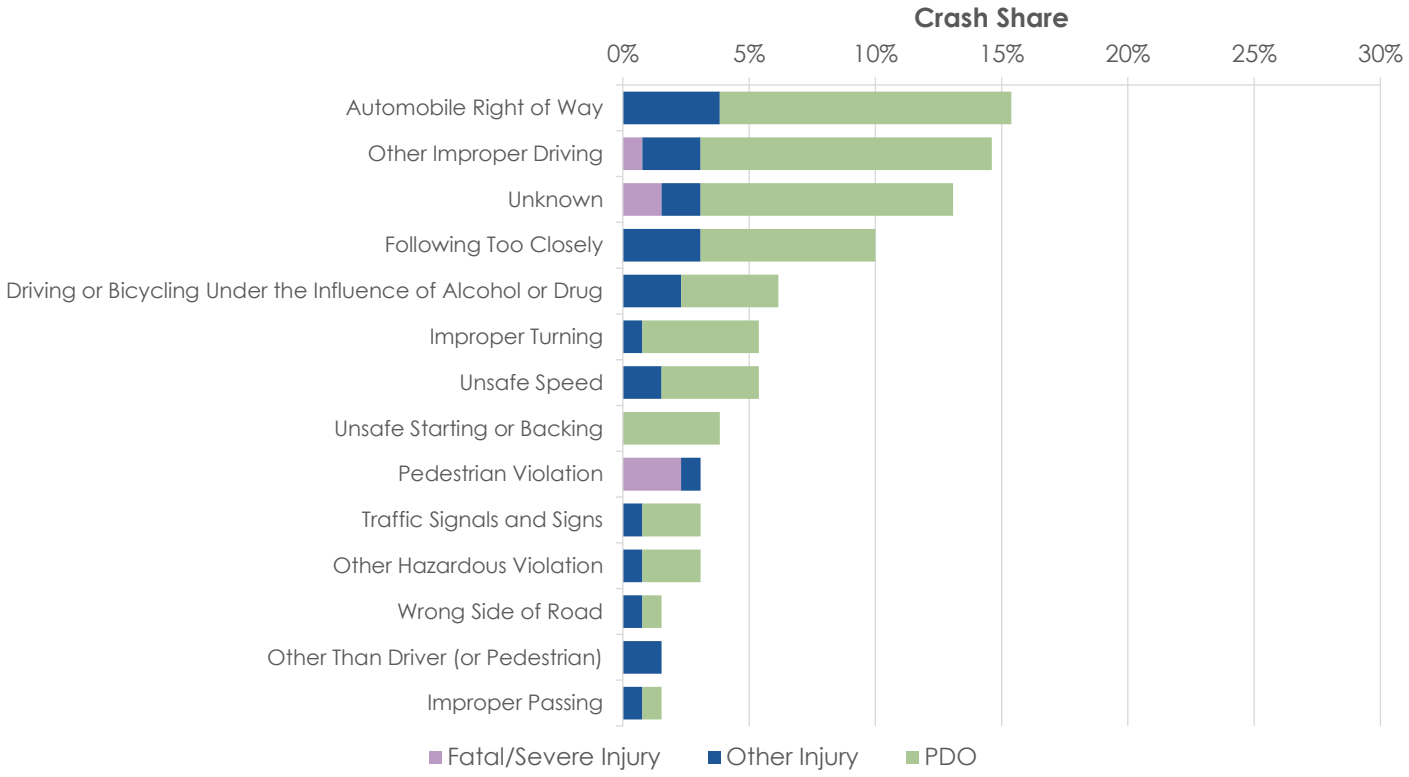
[22] Two crashes involving pedestrians were originally coded in the data as *head on* crashes. Kittelson recoded the collision type for these two to *vehicle/pedestrian*, given that the other information available in the data indicated each collision involved one motor vehicle and one pedestrian.

PRIMARY COLLISION FACTOR

Reporting officers identify a primary collision factor (PCF) for each collision. It is up to the officer's judgement and information available at the scene for them to select the factor that is most relevant. Officers select one from among a list of PCFs based on California Vehicle Code (CVC) and road user behavior. Figure 47 presents the most frequently cited PCFs.

- Among total reported crashes, the three most frequently reported PCFs are **automobile right of way**[23] (15 percent), **other improper driving**[1824] (15 percent), and unknown/not reported (13 percent). These three account for 43 percent of reported crashes.
- Among the six reported fatal/severe injury crashes, three of the crashes had reported PCFs of **pedestrian violation**[25] (three of six for 50 percent). Two crashes had unknown or unreported PCFs, and the remaining one had a PCF of **other improper driving**[24].

Figure 47: Collision by Reported PCF and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

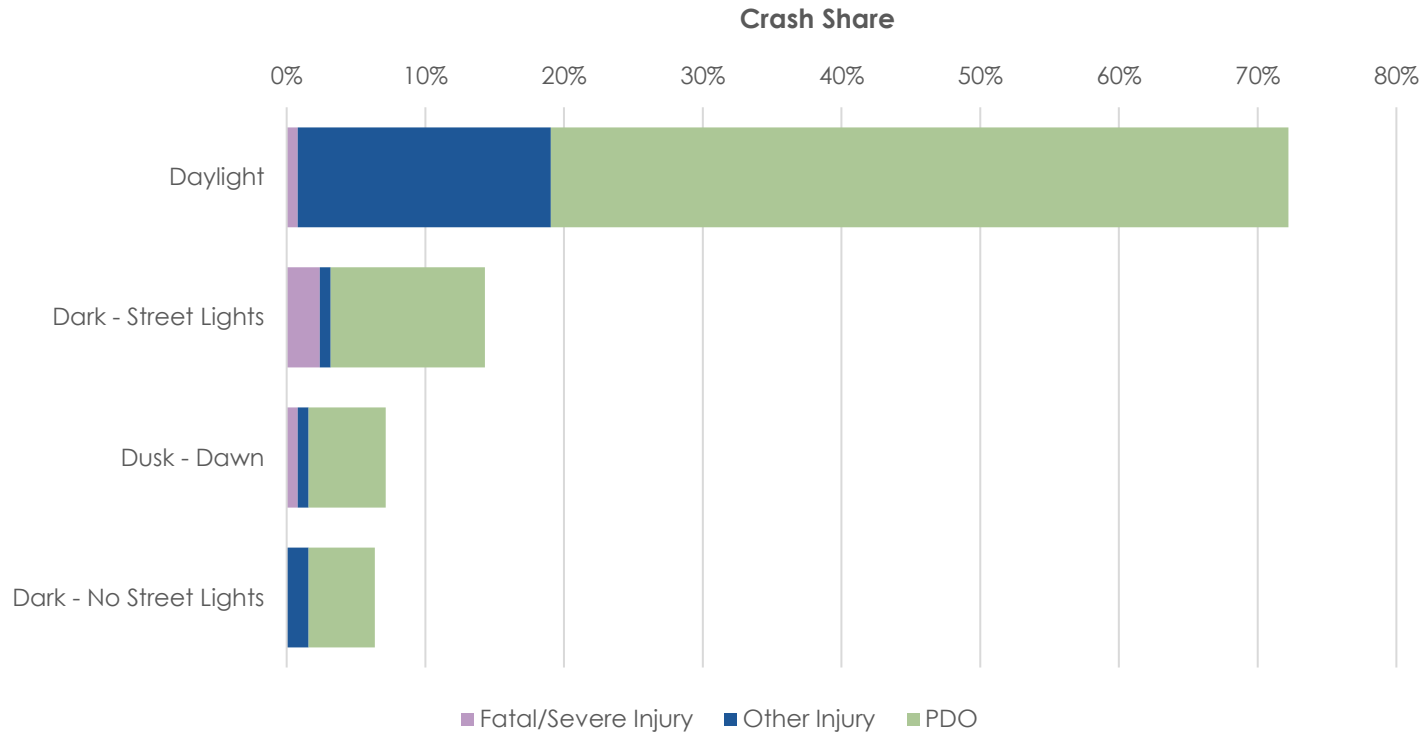
[23] Reported PCF based on CVC violation indicating a driver turning failed to yield right-of-way to oncoming traffic.
[24] Reported PCF based on CVC violation indicating driving from a direct course without reasonable safety or not signaling appropriately.
[25] Reported PCF based on CVC violation indicating a pedestrian failure to yield the right of way to other vehicles.

LIGHTING

Figure 48 shows citywide crashes by reported lighting condition and severity.

- Crashes that occurred in daylight conditions make up 72 percent of total reported crashes and account for one of the five fatal/severe injury crashes.
- The remaining four fatal/severe injury crashes occurred in the dark with streetlights (three crashes) and in dusk/dawn conditions (one crash).

Figure 48: Crashes by Lighting and Severity

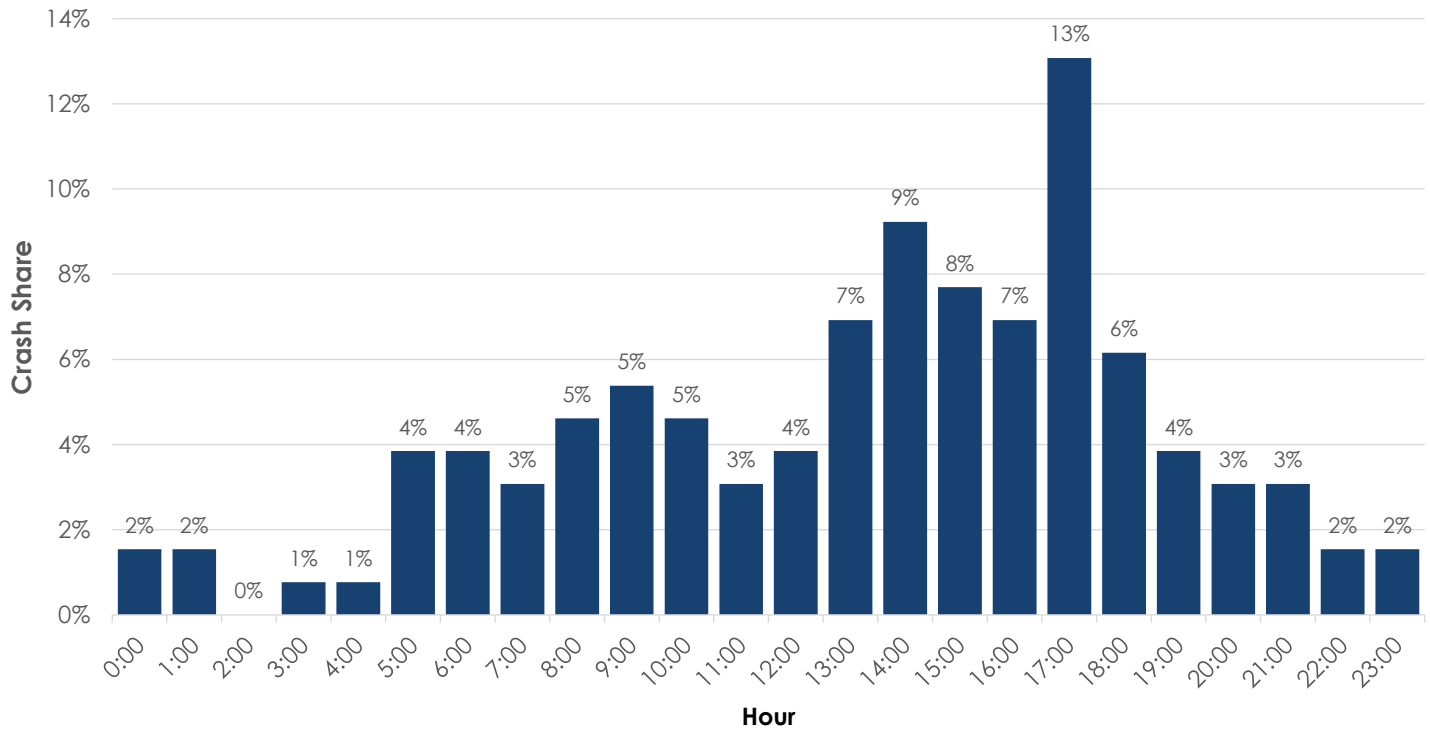


Source: SWITRS, TIMS, Kittelson, 2021
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

TIME OF DAY

Figure 49 shows crashes by time of day. A higher share of crashes occurred during the afternoon with the highest portion occurring in the 5 PM to 6 PM hour.

Figure 49: Crash Share by Time of Day



Source: SWITRS, TIMS, Kittelson, 2021.

Pedestrians

This section focuses exclusively on crashes involving pedestrians. Table 21 shows the distribution of pedestrian crashes by severity. Of the seven reported pedestrian crashes, 43 percent were fatal or resulted in a severe injury. Reported pedestrian crashes make up 50 percent of all reported fatal/severe crashes, compared to 5 percent of total reported crashes.

Table 21: Pedestrian Involved Crashes by Severity

	Fatal (% of Total)	Severe Injury (% of Total)	Visible Injury (% of Total)	Complaint of Pain (% of Total)	Property Damage Only (% of Total)	Total
Pedestrian Involved	3 (43%)	0 (0%)	1 (14%)	2 (29%)	1 (14%)	7 (100%)

Source: SWITRS, TIMS, Kittelson, 2021.

SEVERITY AND MONTH

The reported pedestrian crashes were generally dispersed throughout the 12 months. October recorded the most reported pedestrian crashes, with three crashes.

- **January** had one fatal pedestrian crash.
- **March** had one injury pedestrian crash.
- **May** had one property damage only pedestrian crash.
- **September** had one injury pedestrian crash.
- **October** had a total of three pedestrian crashes: two fatal and one injury.

PEDESTRIAN ACTION AND LOCATION

For pedestrian crashes, data are coded according to the reporting officer's judgment about the pedestrian's action and location preceding the crash.

- Two fatal crashes occurred as pedestrians were "crossing not in crosswalk."
- One fatal crash, one injury crash, and one PDO crash occurred with the pedestrian action "crossing in crosswalk at intersection" reported.
- The pedestrian action "in road, including shoulder" was reported in two injury crashes.

LIGHTING

Two fatal crashes occurred in the dark with streetlights and one fatal crash occurred during dusk – dawn. One injury crash occurred in the dark with no streetlights. The remaining two injury crashes and PDO crash occurred during daylight.

Bicyclists

One bicycle crash, resulting in injury, was reported between 2015 and 2019. The crash was reported as a **vehicle/pedestrian** collision with a primary contributing factor of **other than driver (or pedestrian),** with the bicyclist coded as at fault.[26] The crash was reported to have occurred in dusk conditions around 5 PM.

Priority Locations

Kittelson identified priority intersections and segments in Firebaugh using the annualized crash severity scores and excess predicted crashes described in the Data Summary and Analysis Approach sections (see the Introduction).

For intersection locations, the crash severity scores ranged from zero (no reported crashes during the five years) to 43.12. Figure 50 shows the results of the crash severity scoring. Figure 51 shows excess predicted crash scores by percentiles for intersection locations. For the half-mile roadway segments, the crash severity scores ranged from zero to 33.13. Crash severity score results for roadway segments are shown in Figure 52. Excess predicted crash score results are shown in Figure 53. Intersections or segments shown as not falling within one of the percentile breaks indicates there were no reported crashes at that location.

Table 22 presents the top twenty locations with the highest crash severity scores.

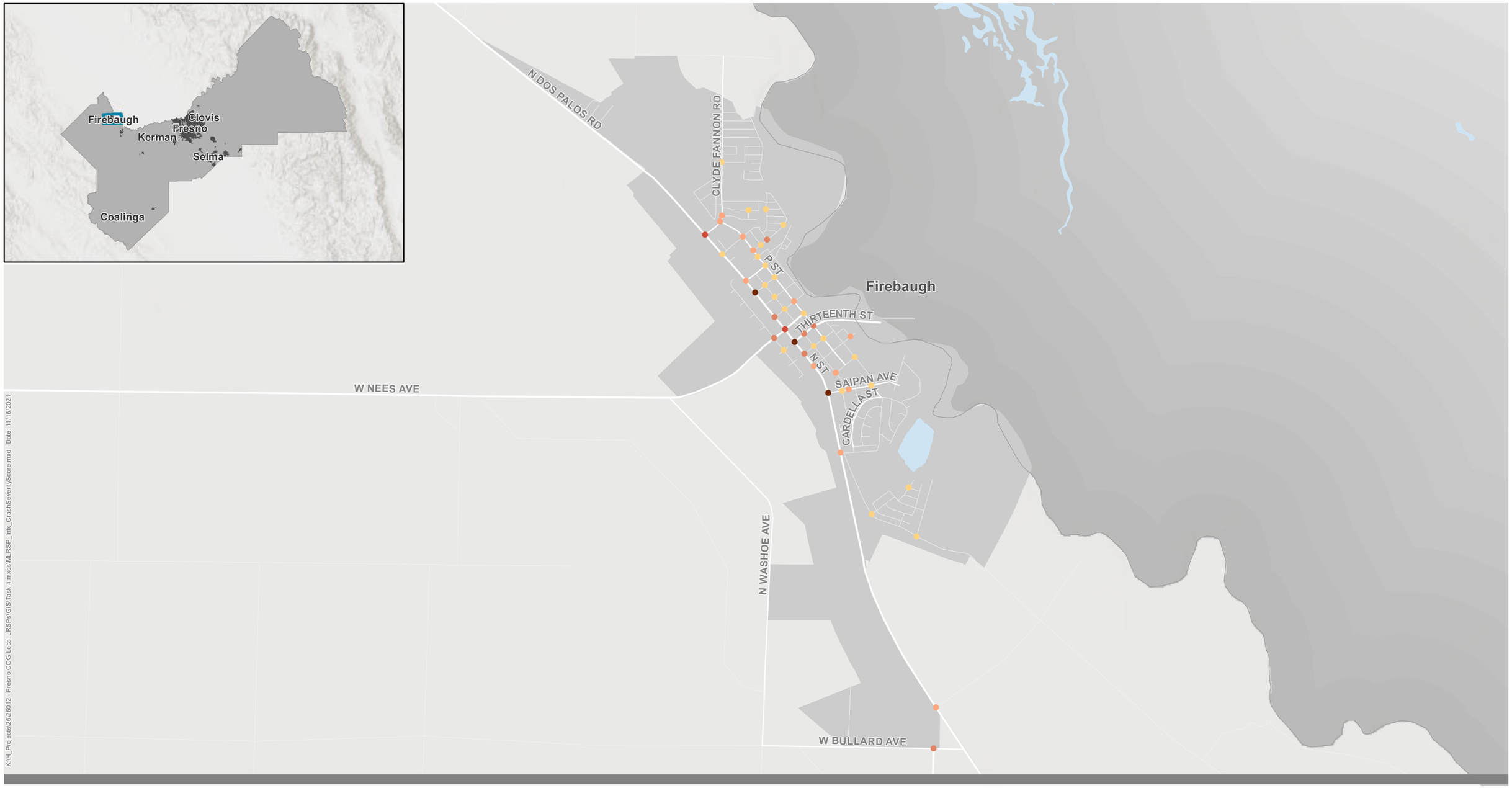
Table 22. Top 20 Locations based on Crash Severity Score

#	Location	Type	Crash Severity Score	Total Number of Crashes	Severity				
					Fatal	Severe Injury	Other Visible Injury	Complaint of Pain	PDO
1	N ST & SAIPAN AVE	Unsignalized	43.12	7	1	0	2	0	4
2	N ST & NINTH ST	Unsignalized	38.25	2	0	1	0	0	1
3	THIRTEENTH ST FROM P ST TO CITY LIMITS	Segment	33.13	2	1	0	0	0	1
4	N ST FROM SEIERRA AVE TO NORTH OF SIERRA AVE	Segment	33.13	2	0	1	0	0	1
5	THIRTEENTH ST & N ST	Signal	28.16	7	1	0	0	3	3
6	TWELFTH ST & N ST	Signal	25.71	10	1	0	0	0	9
7	N ST & CLYDE FANNON RD	Unsignalized	5.47	7	0	0	0	4	3
8	N ST & ELEVENTH ST	Unsignalized	4.36	7	0	0	1	1	5
9	TWELFTH ST & M ST	Unsignalized	2.74	4	0	0	1	0	3

[26] Other information available about this collision does not indicate that a pedestrian was involved. The reporting officer may have been imprecise in coding the collision type or an error may have been made in entering data from the collision report into the database.

#	Location	Type	Crash Severity Score	Total Number of Crashes	Severity				
					Fatal	Severe Injury	Other Visible Injury	Complaint of Pain	PDO
10	N STREET FROM CLYDE FANNON RD TO CORDEL AVE	Segment	2.54	3	0	0	1	0	2
11	CLINE ST & R ST	Unsignalized	2.43	2	0	0	0	2	0
12	THIRTEENTH ST & P ST	Unsignalized	2.42	7	0	0	0	1	6
13	SAN DIEGO AVE & BULLARD AVE	Unsignalized	2.34	2	0	0	1	0	1
14	N ST & FOURTEENTH ST	Unsignalized	2.34	2	0	0	1	0	1
15	WASHOE AVE FROM NORTH OF BULLARD AVE TO SOUTH OF NEES AVE	Segment	2.34	2	0	0	1	0	1
16	N ST FROM MORRIS KYLE DR TO CITY LIMITS (SOUTH)	Segment	2.34	2	0	0	1	0	1
17	THIRTEENTH ST & O ST	Unsignalized	2.22	6	0	0	0	1	5
18	O ST & SIXTEENTH ST	Unsignalized	2.14	1	0	0	1	0	0
19	DOS PALOS RD & SIERRA AVE	Unsignalized	1.62	3	0	0	0	1	2
20	REV KANTOR ST FROM CLYDE FANNON RD TO ZOZAYA ST	Segment	1.62	3	0	0	0	1	2

Note: PDO = Property Damage Only



Crash Severity Score

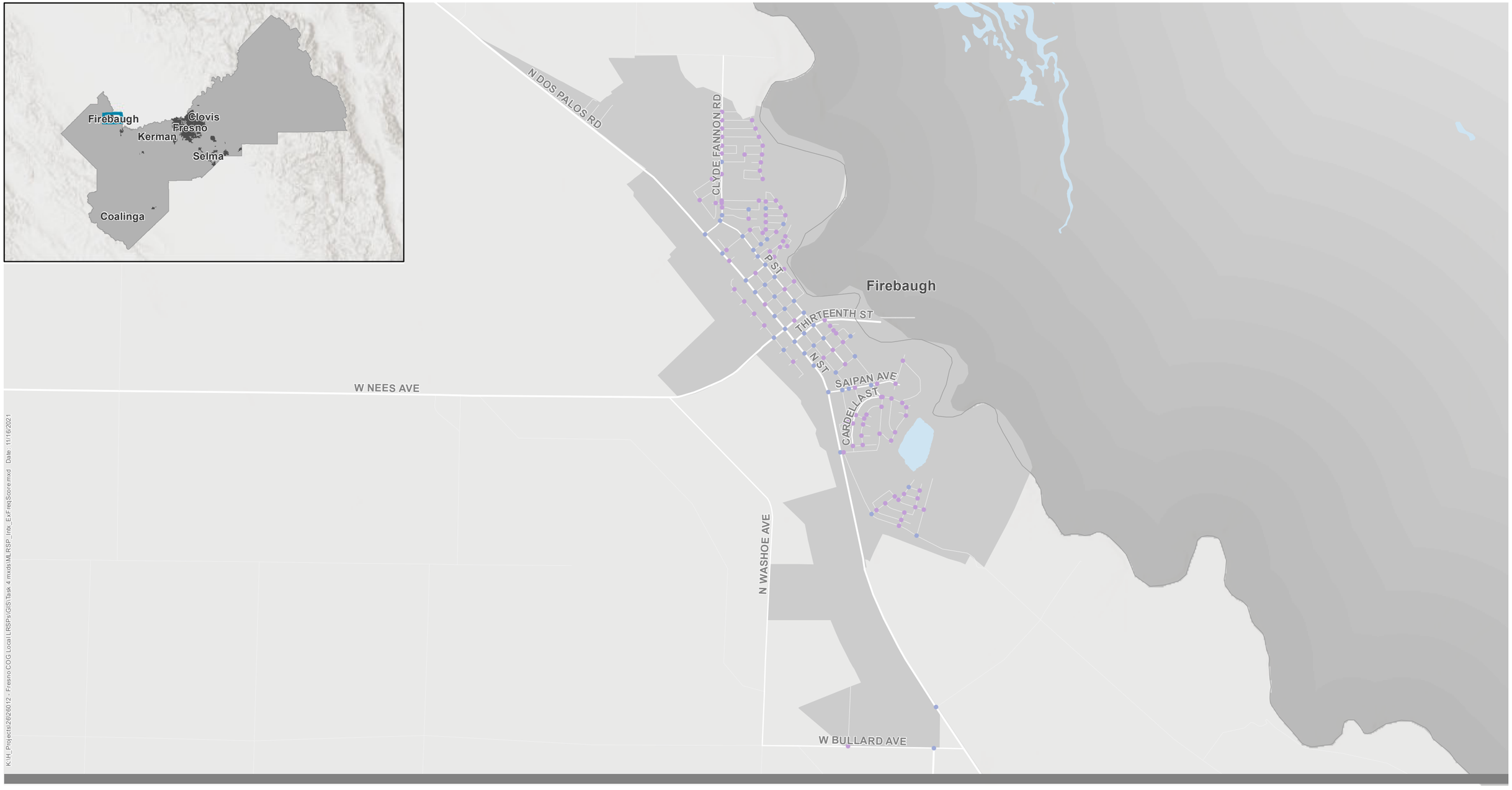
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 0.45 Miles

Figure 50

Intersection Crash Severity Scores
Jurisdiction Results: Firebaugh
Fresno Council of Governments

KITTELSON & ASSOCIATES



Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile

City Limits

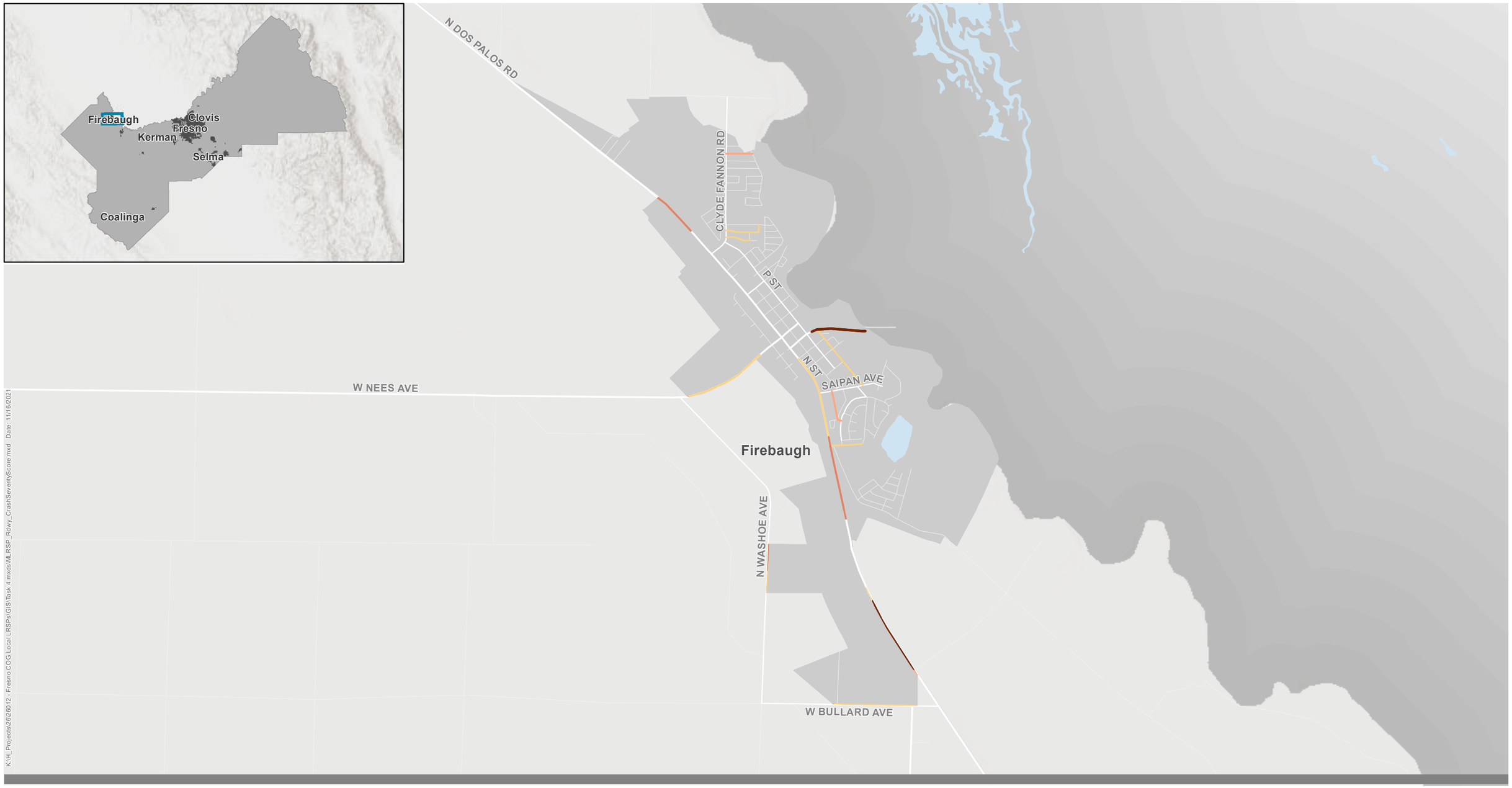
County Boundary

0 0.45 Miles

Figure 51

Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Firebaugh
Fresno Council of Governments

KITTELSON & ASSOCIATES



Crash Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

Figure 52

Roadway Crash Severity Scores Jurisdiction Results: Firebaugh Fresno Council of Governments

KITTELSON & ASSOCIATES

Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 0.6 Miles

Figure 53

Roadway Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Firebaugh
Fresno Council of Governments

KITTELSON & ASSOCIATES

EMPHASIS AREAS

Based on key trends in the crash data, emphasis areas for the City of Firebaugh include pedestrian crashes, head on crashes, and hit object crashes. The primary collision factors of automobile right of way and other improper driving are the most commonly cited overall and among fatal and serve injury crashes. Therefore, strategies aimed at encouraging safe driver behaviors is included as an emphasis area. In addition, the data review suggests that the crash data available for the City may be incomplete, which limits the ability to systematically identify locations for improvement. Each of these areas is further discussed below.

Pedestrian Crashes

Pedestrian crashes were identified as a focus area given the overrepresentation of pedestrians in fatal crashes. Half of the six fatal crashes involve a pedestrian, two of which were reported to occur when a pedestrian was "crossing not in a crosswalk" and one of which occurred when a pedestrian was reported as "crossing in crosswalk at intersection." This suggests opportunities for improvements to pedestrian infrastructure.

Pedestrians are identified as one of the six high priority challenge areas in the California SHSP. The high priority areas represent "the greatest opportunity to reduce fatalities and serious injuries across the state" (Caltrans SHSP).

Head on Crashes

Head on crashes were selected as an emphasis area as one of the two severe injury crashes and two of the 27 other injury crashes were classified as a head on crashes. As discussed below under Engineering Strategies, countermeasures are available targeted at head on crashes.

The California SHSP includes lane departures as one of the six high priorities in California. As indicated in the Caltrans SHSP, "the Lane Departures Challenge Area includes head-on, hit object, and overturned crashes. This includes instances where a vehicle runs off the road or crosses into the opposing lane prior to the crash." These crashes are a high priority due to their severity level.

Hit Object Crashes

Hit object crashes were selected as an emphasis area due to the severity of the crashes. One of the ten hit object crashes resulted in a fatality and one in other injury. A variety of roadway countermeasures are available targeted at and reducing hit object crashes. As discussed below under Engineering Strategies, countermeasures are available targeted at hit object crashes.

As indicated under head on crashes discussion, the California SHSP includes lane departures – which includes hit object crashes – as one of the six high priorities in California.

Driver Behaviors

The primary collision factors of automobile right of way and other improper driving were cited in one of the two severe crashes and seven of the 27 other injury crashes. These primary collision factors reference a CVC violation where a driver turning failed to yield right-of-way to oncoming traffic or drove from a straight course without reasonable safety or signaling property. The majority of crashes with these PCFs were classified as rear end or sideswipe. A combination of engineering, education and enforcement strategies aimed at encouraging safe driver behaviors can be utilized. Each of these areas is further discussed below.

Improved Data Collection

Improved crash data collection is identified as an emphasis area as a lack of reporting could contribute to the absence of crashes for analysis in 2015 and potentially missing data for 2016 through 2019. High quality data is an essential component of achieving Firebaugh's goals, namely being able to systematically implement safety countermeasures.

STRATEGIES

The following subsections present engineering, education, emergency services, and enforcement strategies to help improve roadway safety within the City of Firebaugh.

Engineering Strategies

The three fatal and severe injury collision types reported in Firebaugh were **vehicle-pedestrian**, **head on**, and **hit object** crashes. The fatal and severe injury primary collision factors reported were **pedestrian violation** and **other improper driving**, and **automobile right of way** was the most frequently reported primary collision factor. High priority countermeasures to address these collision types and primary collision factors are shown in Table 23.

Table 23. High Priority Countermeasures

	Countermeasure Name	ID	Crashes Addressed
Roadway Countermeasures	Street Lighting	R1	Crashes at night
	Remove or Relocate Fixed Objects Outside of Clear Recovery Zone	R2	Hit object
	Install Guardrails	R4	Hit object
	Road Diet	R14	Hit object
	Widen Shoulder	R15	Hit object
	Install/Upgrade Signs with New Fluorescent Sheeting	R22	Hit object
	Install Dynamic/Variable Speed Warning Sings	R26	Hit object
	Install Edgelines and Centerlines	R28	Hit object
	Install Centerline Rumble Strips/Stripes	R30	Head on
	Install Edgeline Rumble Strips/Stripes	R31	Hit object
	Install Dynamic Regulatory Speed Warning Signs	n/a	Hit object
Intersection Countermeasures	Add Intersection Lighting at Intersections	S1/NS1	Crashes at night
	No Right-Turn on Red	n/a	Vehicle-pedestrian, pedestrian violation
	Convert Intersection to Roundabout	NS4/NS5	All
Pedestrian/Bicycle Countermeasures	Install Sidewalk/Pathway	R34PB	Pedestrian violation
	Install/Upgrade Pedestrian Crossing with Enhanced Features	R35PB	Vehicle-pedestrian, pedestrian violation
	Install Raised Medians (or Refuge Islands)	NS19PB	Vehicle-pedestrian, pedestrian violation
	Install/Upgrade Pedestrian Crossing at Uncontrolled Locations (with Enhanced Safety Features)	NS21PB	Vehicle-pedestrian

Note: The ID number references the Caltrans Manual Local Road Safety

Appendix B contains the regional Countermeasures Toolbox which includes more detailed information regarding the countermeasures listed above.

The following figures and tables provide data on collision types and factors for the intersections and roadways with the highest crash scores. The locations with the highest crash scores may be top priorities for implementing countermeasures and pursuing grants. Firebaugh can use the information about collision type and factors to identify potential countermeasures to apply, using the information in Table 23.

Figure 54 and Figure 55 present the top priority intersections and breakdown of the top collision types and primary collision factors, respectively. Figure 56 and Figure 57 present the top priority roadways and breakdown of the top collision types and primary collision factors, respectively.

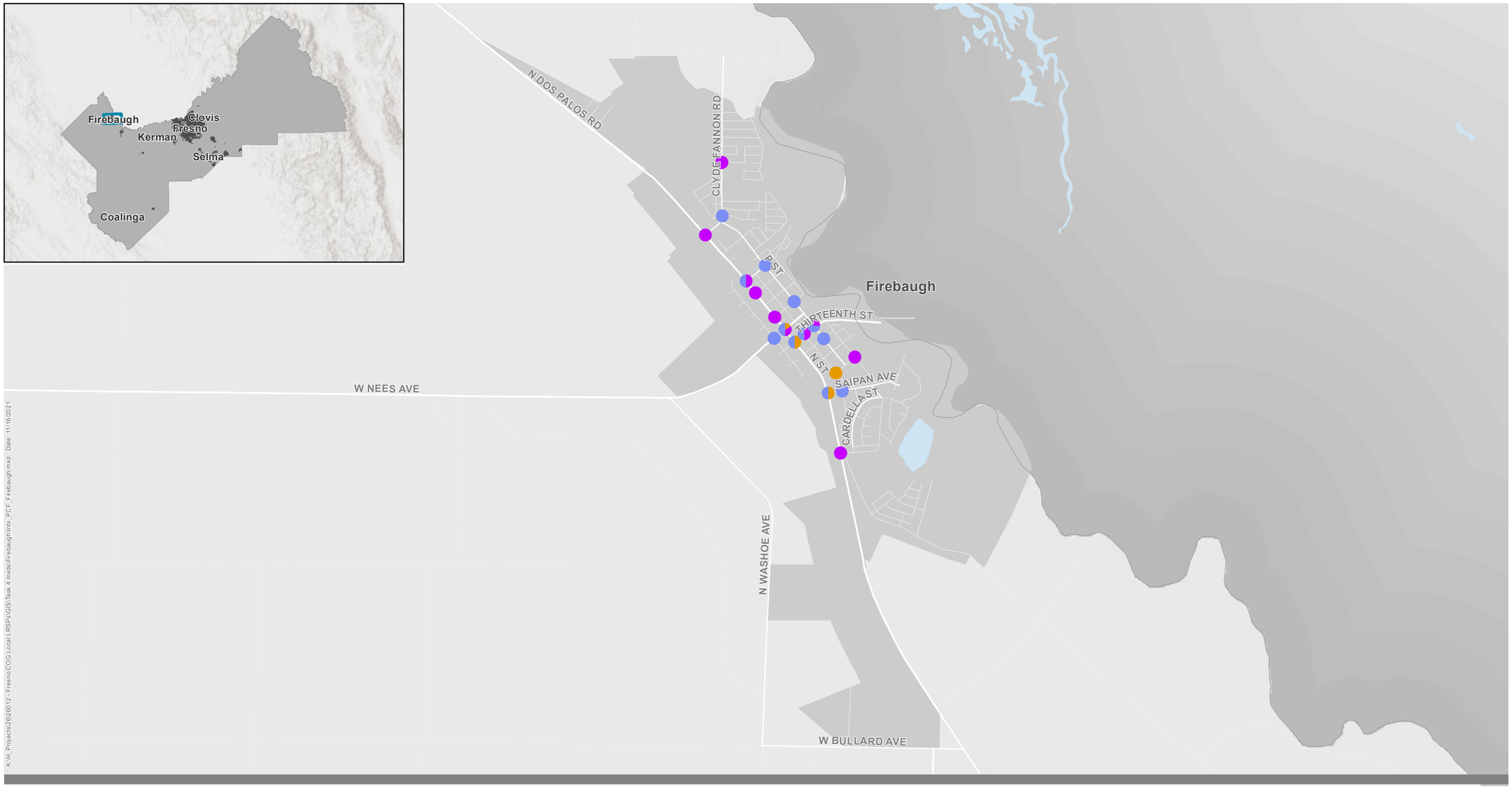
Collision Type

- Vehicle-Pedestrian
- Head On
- Hit Object
- City Limits
- County Boundary

KITTELSON & ASSOCIATES

Figure 54

Top Fatal/Severe Injury Intersection Collision Types
Jurisdiction Results: Firebaugh
Fresno Council of Governments



Primary Collision Factors

- Pedestrian Violation
- Automobile Right of Way
- Other Improper Driving

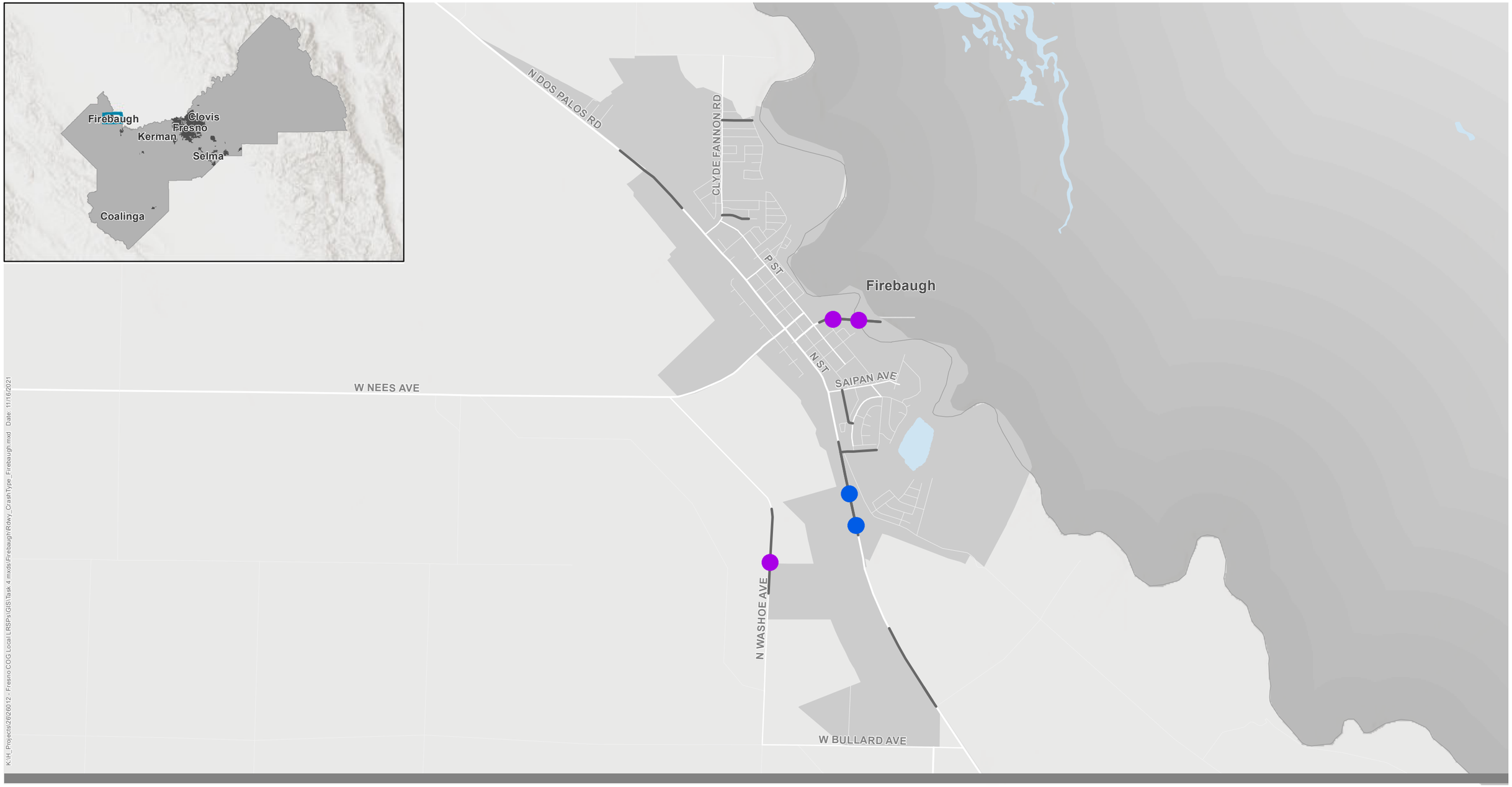
- City Limits
- County Boundary

0 0.45 Miles

KITTELSON & ASSOCIATES

Figure 55

Top Fatal/Severe Injury Intersection Primary Collision Factors
Jurisdiction Results: Firebaugh
Fresno Council of Governments



Collision Type

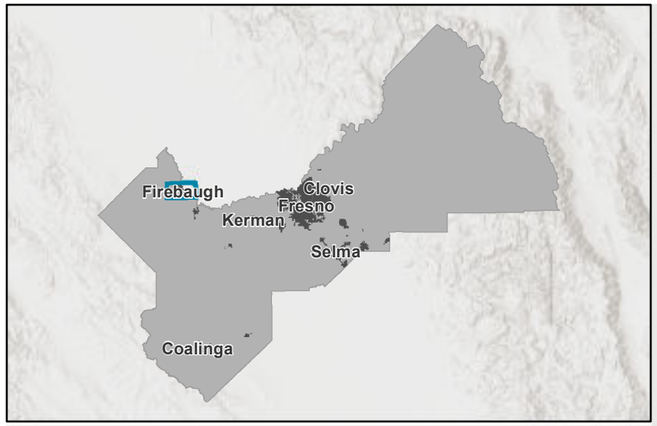
- Head On
- Hit Object
- Priority Roadways
- City Limits
- County Boundary

0 0.45 Miles

Figure 56

Top Fatal/Severe Injury Roadway Collision Types
Jurisdiction Results: Firebaugh
Fresno Council of Governments

KITTELSON & ASSOCIATES



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Primary Collision Factors

- Other Improper Driving
- Priority Roadways
- City Limits
- County Boundary

0 0.45 Miles

Figure 57

Top Fatal/Severe Injury Roadway Primary Collision Factors
Jurisdiction Results: Firebaugh
Fresno Council of Governments

KITTELSON & ASSOCIATES

Table 24 and Table 25 provide information for the top 46 intersection locations (based on crash severity score), including control type (signalized or unsignalized), crash severity score, and total number of crashes by collision type or primary collision factor.

Table 24. Priority Intersections with Collision Type based on Top 3 Fatal/Severe Injury Collision Types

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Collision Type			
					Vehicle/ Ped	Head On	Hit Object	Other
1	N ST & SAIPAN AVE	Unsignalized	43.12	7	0	2	0	5
2	N ST & NINTH ST	Unsignalized	38.25	2	0	1	0	1
3	THIRTEENTH ST & N ST	Signal	28.16	7	1	0	0	6
4	TWELFTH ST & N ST	Signal	25.71	10	0	1	0	9
5	N ST & CLYDE FANNON RD	Unsignalized	5.47	7	1	0	0	6
6	N ST & ELEVENTH ST	Unsignalized	4.36	7	0	0	0	7
7	TWELFTH ST & M ST	Unsignalized	2.74	4	0	0	0	4
8	CLINE ST & R ST	Unsignalized	2.43	2	1	0	0	1
9	THIRTEENTH ST & P ST	Unsignalized	2.42	7	1	0	1	5
10	SAN DIEGO AVE & BULLARD AVE	Unsignalized	2.34	2	0	0	2	0
11	N ST & FOURTEENTH ST	Unsignalized	2.34	2	0	0	0	2
12	THIRTEENTH ST & O ST	Unsignalized	2.22	6	0	1	0	5
13	O ST & SIXTEENTH ST	Unsignalized	2.14	1	1	0	0	0
14	DOS PALOS RD & SIERRA AVE	Unsignalized	1.62	3	0	0	0	3
15	FIFTEENTH ST & R ST	Unsignalized	1.22	1	0	0	0	1
16	P ST & CLINE ST	Unsignalized	1.22	1	0	0	0	1
17	CLYDE FANNON RD & MENDOZA DR	Unsignalized	1.22	1	0	1	0	0
18	ELEVENTH ST & P ST	Unsignalized	0.60	3	0	0	1	2
19	N ST & EIGHTH ST	Unsignalized	0.60	3	0	0	1	2
20	SAIPAN AVE & O ST	Unsignalized	0.40	2	0	0	0	2
21	N ST & FIFTEENTH ST	Unsignalized	0.40	2	0	0	0	2
22	YIP ST & P ST	Unsignalized	0.40	2	0	1	0	1
23	CLYDE FANNON RD & P ST	Unsignalized	0.40	2	0	0	0	2
24	N ST & MORRIS KYLE DR	Unsignalized	0.40	2	0	1	0	1
25	ALDER WAY & OAK ST	Unsignalized	0.20	1	0	0	0	1
26	HELM CANAL RD & BIRCH DR	Unsignalized	0.20	1	0	0	0	1
27	HELM CANAL RD & POPLAR WAY	Unsignalized	0.20	1	0	0	1	0
28	SAIPAN AVE & CORREGIDOR AVE	Unsignalized	0.20	1	0	0	0	1
29	SAIPAN AVE & GREENACRE ST	Unsignalized	0.20	1	0	0	0	1
30	SIXTEENTH ST & Q ST	Unsignalized	0.20	1	0	0	0	1
31	THIRTEENTH ST & M ST	Unsignalized	0.20	1	0	0	0	1

#	Location	Control Type	Crash Severity Score	Total Number of Crashes	Collision Type			
					Vehicle/ Ped	Head On	Hit Object	Other
32	FOURTEENTH ST & O ST	Unsignalized	0.20	1	0	1	0	0
33	FOURTEENTH ST & P ST	Unsignalized	0.20	1	0	0	0	1
34	TWELFTH ST & P ST	Unsignalized	0.20	1	0	0	0	1
35	ELEVENTH ST & O ST	Unsignalized	0.20	1	0	0	0	1
36	TENTH ST & O ST	Unsignalized	0.20	1	0	0	0	1
37	NINTH ST & O ST	Unsignalized	0.20	1	0	0	1	0
38	NINTH ST & P ST	Unsignalized	0.20	1	0	0	0	1
39	EIGHTH ST & P ST	Unsignalized	0.20	1	0	0	1	0
40	SEVENTH ST & P ST	Unsignalized	0.20	1	0	0	0	1
41	N ST & YIP ST	Unsignalized	0.20	1	0	0	0	1
42	CLINE ST & Q ST	Unsignalized	0.20	1	0	1	0	0
43	CLINE ST & T ST	Unsignalized	0.20	1	0	0	0	1
44	ZOZAYA ST & ALLARDT DR	Unsignalized	0.20	1	0	0	0	1
45	ALLARDT DR & MENDOZA DR	Unsignalized	0.20	1	0	0	0	1
46	CLYDE FANNON RD & BORBOA LN	Unsignalized	0.20	1	0	0	0	1

Note: Other crashes include all crashes that are not coded as one of the top three collision types

Table 25. Priority Intersections with Primary Collision Factor based on Top 3 Fatal/Severe Injury Primary Collision Factors

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Pedestrian Violation	Auto ROW	Other Improper Driving	Other
1	N ST & SAIPAN AVE	Unsignalized	43.12	7	1	0	1	5
2	N ST & NINTH ST	Unsignalized	38.25	2	0	1	0	2
3	THIRTEENTH ST & N ST	Signal	28.16	7	1	0	1	5
4	TWELFTH ST & N ST	Signal	25.71	10	1	2	3	6
5	N ST & CLYDE FANNON RD	Unsignalized	5.47	7	0	4	0	7
6	N ST & ELEVENTH ST	Unsignalized	4.36	7	0	4	0	7
7	TWELFTH ST & M ST	Unsignalized	2.74	4	0	0	1	3
8	CLINE ST & R ST	Unsignalized	2.43	2	0	0	0	2
9	THIRTEENTH ST & P ST	Unsignalized	2.42	7	0	1	3	4
10	SAN DIEGO AVE & BULLARD AVE	Unsignalized	2.34	2	0	0	0	2
11	N ST & FOURTEENTH ST	Unsignalized	2.34	2	0	0	0	2
12	THIRTEENTH ST & O ST	Unsignalized	2.22	6	0	2	2	4
13	O ST & SIXTEENTH ST	Unsignalized	2.14	1	1	0	0	0
14	DOS PALOS RD & SIERRA AVE	Unsignalized	1.62	3	0	0	0	3
15	FIFTEENTH ST & R ST	Unsignalized	1.22	1	0	0	0	1
16	P ST & CLINE ST	Unsignalized	1.22	1	0	0	0	1

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Pedestrian Violation	Auto ROW	Other Improper Driving	Other
17	CLYDE FANNON RD & MENDOZA DR	Unsignalized	1.22	1	0	0	1	0
18	ELEVENTH ST & P ST	Unsignalized	0.60	3	0	0	1	2
19	N ST & EIGHTH ST	Unsignalized	0.60	3	0	1	1	2
20	SAIPAN AVE & O ST	Unsignalized	0.40	2	0	0	0	2
21	N ST & FIFTEENTH ST	Unsignalized	0.40	2	0	0	0	2
22	YIP ST & P ST	Unsignalized	0.40	2	0	0	0	2
23	CLYDE FANNON RD & P ST	Unsignalized	0.40	2	0	0	0	2
24	N ST & MORRIS KYLE DR	Unsignalized	0.40	2	0	1	0	2
25	ALDER WAY & OAK ST	Unsignalized	0.20	1	0	0	0	1
26	HELM CANAL RD & BIRCH DR	Unsignalized	0.20	1	0	0	0	1
27	HELM CANAL RD & POPLAR WAY	Unsignalized	0.20	1	0	0	0	1
28	SAIPAN AVE & CORREGIDOR AVE	Unsignalized	0.20	1	0	0	1	0
29	SAIPAN AVE & GREENACRE ST	Unsignalized	0.20	1	0	0	0	1
30	SIXTEENTH ST & Q ST	Unsignalized	0.20	1	0	1	0	1
31	THIRTEENTH ST & M ST	Unsignalized	0.20	1	0	0	0	1
32	FOURTEENTH ST & O ST	Unsignalized	0.20	1	0	0	0	1
33	FOURTEENTH ST & P ST	Unsignalized	0.20	1	0	0	1	0
34	TWELFTH ST & P ST	Unsignalized	0.20	1	0	0	0	1
35	ELEVENTH ST & O ST	Unsignalized	0.20	1	0	0	0	1
36	TENTH ST & O ST	Unsignalized	0.20	1	0	0	0	1
37	NINTH ST & O ST	Unsignalized	0.20	1	0	0	0	1
38	NINTH ST & P ST	Unsignalized	0.20	1	0	0	0	1
39	EIGHTH ST & P ST	Unsignalized	0.20	1	0	0	1	0
40	SEVENTH ST & P ST	Unsignalized	0.20	1	0	0	0	1
41	N ST & YIP ST	Unsignalized	0.20	1	0	0	0	1
42	CLINE ST & Q ST	Unsignalized	0.20	1	0	0	0	1
43	CLINE ST & T ST	Unsignalized	0.20	1	0	0	0	1
44	ZOZAYA ST & ALLARDT DR	Unsignalized	0.20	1	0	0	0	1
45	ALLARDT DR & MENDOZA DR	Unsignalized	0.20	1	0	0	0	1
46	CLYDE FANNON RD & BORBOA LN	Unsignalized	0.20	1	0	1	0	1

Note: Other crashes include all crashes that are not coded as one of the top three primary collision factors

Table 26 and Table 27 provide information for the top ten roadway segments (based on crash severity score), including roadway classification, crash severity score, and total number of crashes by collision type or primary collision factor.

Table 26. Priority Roadways Segments with Collision Type based on Top 3 Fatal/Severe Injury Collision Types

#	Location	Classification	Crash Severity Score	Total Number of Crashes	Collision Type			
					Vehicle/ Ped	Head On	Hit Object	Other
1	Thirteenth St (west of Q St to city limits)	Arterial/Collector	33.13	2	0	0	2	0
2	SR 33 (south of N St to Sierra Ave)*	Arterial/Collector	33.13	2	0	0	0	2
3	SR 33 (south of N St to Sierra Ave)*	Arterial/Collector	32.93	1	0	0	0	1
4	SR 33 (south of Cordel Ave to north of Clyde Fannon Rd)*	Arterial/Collector	2.54	3	0	0	0	3
5	SR 33 (Morris Kyle Dr to north of city limits)*	Arterial/Collector	2.34	2	0	1	0	1
6	N Washoe Ave (south of W Nees Ave to north of W Bullard Ave)	Arterial/Collector	2.34	2	0	0	1	1
7	Rev Kantor St (Clyde Fannon Rd to Zozaya St)	Local	1.62	3	0	0	0	3
8	Corregidor Ave (Saipan Ave to Cardella St)	Local	0.40	2	0	0	0	2
9	Mendoza Dr (Clyde Fannon Rd to Menodza Dr)	Local	0.20	1	0	0	0	1
10	Morris Kyle Dr (N St to Landucci Dr)	Local	0.20	1	0	0	0	1

** Roadway segment is an at-grade Caltrans facility.*
Note: Other crashes include all crashes that are not coded as one of the top three collision types

Table 27. Priority Roadways Segments with Primary Collision Factors based on Top 3 Fatal/Severe Injury Primary Collision Factors

#	Location	Classification	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Ped Viola-tion	Auto ROW	Other Improper Driving	Other
1	Thirteenth St (west of Q St to city limits)	Arterial/ Collector	33.13	2	0	0	0	2
2	SR 33 (south of N St to Sierra Ave)*	Arterial/ Collector	33.13	2	0	0	1	1
3	SR 33 (south of N St to Sierra Ave)*	Arterial/ Collector	32.93	1	0	0	1	0
4	SR 33 (south of Cordel Ave to north of Clyde Fannon Rd)*	Arterial/ Collector	2.54	3	0	0	0	3
5	SR 33 (Morris Kyle Dr to north of city limits)*	Arterial/ Collector	2.34	2	0	0	0	2
6	N Washoe Ave (south of W Nees Ave to north of W Bullard Ave)	Arterial/ Collector	2.34	2	0	0	0	2
7	Rev Kantor St (Clyde Fannon Rd to Zozaya St)	Local	1.62	3	0	0	0	3
8	Corregidor Ave (Saipan Ave to Cardella St)	Local	0.40	2	0	0	0	2
9	Mendoza Dr (Clyde Fannon Rd to Menodza Dr)	Local	0.20	1	0	0	0	1
10	Morris Kyle Dr (N St to Landucci Dr)	Local	0.20	1	0	0	0	1

** Roadway segment is an at-grade Caltrans facility.*
Note: Other crashes include all crashes that are not coded as one of the top three primary collision factors

Education Strategies

Emphasis areas for Firebaugh include pedestrian crashes and driver behaviors, which can serve as focus areas for education strategies. Half the six reported fatal crashes involved pedestrians and the primary collision factors of automobile right of way and other improper driving were cited in one of the two severe crashes and seven of the 27 other injury crashes. These primary collision factors reference a CVC violation where a driver turning failed to yield right-of-way to oncoming traffic or drove from a straight course without reasonable safety or signaling property.

The Safe Roads Save Lives campaign is a marketing effort led by the Fresno COG, with the goals of:

- Educate all road users on safe transportation behaviors
- Increase safety for people walking and biking
- Highlight behaviors that cause the most crashes in Fresno County—speeding and distracted driving

The campaign Includes branding, social media strategies, print materials, radio and video resources, school resources, and a campaign website. Firebaugh may find these materials helpful, especially those related to pedestrian safety including speeding and watching out for pedestrians.

The following activities are recommended for Firebaugh as they move forward on implementing the Safe Roads Save Lives campaign:

- Identify staff appropriate to attend a presentation by Fresno COG staff about the Safe Roads Save Lives campaign. Appropriate staff members include staff associated with transportation engineering and planning, communications, traffic enforcement, school transportation, and other jurisdictional staff who work with the roadway system.
- Work with schools to distribute print materials and offer school-related transportation resources. Ensure that school communications are in both English and Spanish.
- Work with public information or communications staff to spread Safe Roads Save Lives materials throughout Firebaugh through the following channels:
    - Repost and link to Fresno COG posts that refer to the Safe Roads Save Lives campaign.
    - Have print materials (flyers, bumper stickers, pins, and postcards) available at events and community festivals.
    - Work with the Fresno COG to identify a radio station to air a Safe Roads Save Lives radio public service announcement (PSA).
    - Have a direct link to Safe Roads Save Lives campaign website on the City's website.

Emergency Services

Emergency service organizations depend on safe roadways and efficient communication processes to reach and effectively respond to emergencies. Each type of emergency services organization that serves Firebaugh – law enforcement, fire, emergency medical services (EMS), California Highway Patrol – work independently and collaboratively to develop procedures that allow them to respond to incidents in their own jurisdictions as well as support others as needed. The following recommendations may help improve emergency services response as the various organizations update procedures and policies and continue to partner on roadway safety efforts:

- All roadway safety projects should be vetted by emergency service organizations to ensure that their design does not hamper access.
- As new emergency service and response procedures are developed, roadway safety improvement opportunities should be identified and implications of changes to response times should be considered.
- Firebaugh staff should participate in periodic coordination calls between emergency response agencies to gather and share recent observations about crashes and hot spots, to understand emergent safety issues that may not have led to policy reports or yet be available through statewide crash reporting systems.

Enforcement

Enforcement strategies can include programs or campaigns specifically focused on changing road user behavior through more visible and active enforcement of existing traffic laws, as well as focusing enforcement in areas that have historically been shown to have higher-than-average crash rates. Typically, the effectiveness of enforcement strategies is temporal, meaning they are effective at changing behavior for a discrete period of time – during and shortly after the increased enforcement activities.

The following enforcement strategies should be considered for Firebaugh:

- Add additional crossing guards at high-concern locations. Train community members if needed.
- Focus speed enforcement efforts at locations with high speed-related crash rates.
- Work with schools to conduct "alternative enforcement," such as having students write "tickets" that they hand to community members to highlight positive and negative behaviors on the roadways.

The effectiveness of each strategy should be measured and evaluated, considering the number of staff hours and amount of resources needed. The results should be reviewed and used to refine future enforcement activities.

Enforcement strategies should be undertaken with due caution to avoid inequitable enforcement activities and evaluated to determine the strategy's impact. More details about equitable enforcement can be found on page 8 (Introduction).

EVALUATION AND IMPLEMENTATION

A key part of achieving the City's vision is consistently evaluating roadway safety performance and tracking progress towards the City's goals. The City will develop a process to regularly collect data and information around the performance measures that can be used to assess changes city-wide and at the top priority locations.

As feasible, it is recommended that the City of Firebaugh update this LRSP every three to five years using updated crash data and the performance measures. Comparing the performance measures related to investments made with the crash data should provide a clear indication of the impact of the City's and safety partner's efforts. Future LRSPs may provide new emphasis areas and top priority locations that reflect progress made and new priorities based on trends in the data.

Activities for implementing the plan include:

- Identifying countermeasures and strategies for priority locations based on the crash data.
- Utilizing the Fresno COG Regional Safety Plan to implement regional strategies and share best practices.
- Exploring funding opportunities to implement priority strategies.
- Identifying key activities to support the regional Safe Roads Save Lives campaign.
- Identifying enforcement strategies to implement and evaluate.
- Regularly coordinating with safety partner agencies to assess progress, identify opportunities to implement countermeasures and strategies, and identify opportunities for citizen involvement.
- Regularly collecting and organizing data to support evaluation of the LRSP.

5.0 FRESNO COUNTY

Unincorporated Fresno County has an approximate population of 171,108.[27] The average daily vehicle miles traveled is 6,191,770, and the County maintains approximately 3,997 total roadway centerline miles. Based on the review of crash data conducted as part of the LRSP, pedestrians and bicyclists are overrepresented in fatal and severe injury crashes. The top three fatal and severe injury collision types in unincorporated Fresno County were **broadside**, **hit object**, and **overturned** crashes; the top three fatal and severe injury primary collision factors were **improper turning**, **driving under the influence**, and **unsafe speed**. The LRSP provides potential engineering, education, emergency services, and enforcement strategies tailored to the County's crash history and local priorities, as well as performance measures to evaluate progress.

VISION AND GOALS

The County's vision for roadway safety is:

Create a roadway network that provides a comfortable environment for all modes of transportation within the City.

The County's roadway safety goals in support of the vision are:

1. Use a data-driven approach to identify and prioritize opportunities to reduce the risk of crashes.
2. Implement proven, low-cost engineering countermeasures systemically to maximize funding opportunities across the large geographic County footprint.
3. Partner with adjacent local agencies to promote roadway safety as a priority investment.
4. Reduce the number of annual fatal and severe injury crashes across all public County roadways.
5. Engage citizens to provide feedback on roadway safety issues across the County.
6. Facilitate roadway safety stakeholder collaboration to identify effective ways to implement non-engineering strategies at key locations.
7. Achieve a reduction in the number of lane departure crashes on public County roadways.

[27] 2018 population. Source: California Department of Finance

8. Achieve a reduction in the number of broadside crashes on public County roadways.
9. Establish regular communication between first responders and County staff to discuss ideas, trends, and feedback related to emergency service operations on the roadway network.

SAFETY PARTNERS

A variety of agency staff and community partners were involved throughout the development of this LRSP and played an integral role in identifying priorities, providing local context, and reviewing the existing conditions analysis. Many of the strategies identified in this plan will require coordination with these partners and their support of the County's effort to create a culture of roadway safety. Fresno County's goals reflect the importance of partnering with local agencies, engaging with citizens, and collaborating with safety stakeholders to identify issues and implement solutions. While additional partners may be identified in the future, those involved in development of the LRSP include:

- BNSF Railroad
- California Highway Patrol
- California Rural Legal Assistance, Inc
- Central Unified School District
- Fresno Council of Governments
- Fresno County Administrative Office
- Fresno County Divisions of Public Works and Planning
- Fresno County Rural Transit
- Fresno County Sheriff's Office
- Fresno County Transportation Authority
- Kings Canyon Unified School District
- Riverdale Unified School District
- Tarpey Neighborhood

PERFORMANCE MEASURES

Performance measures are used to track progress and a key element of making data-informed decisions. Performance measures that support the County's vision, goals, and emphasis areas include:

- Annual number of crashes (county-wide and at each of the top twenty priority locations)
- Annual number of fatal and severe injury crashes (county-wide and at each of the top twenty priority locations)
- Annual number of pedestrians and bicycle crashes (county-wide and at each of the top twenty priority locations)
- Annual number of broadside crashes (county-wide)
- Annual number of lane departure and hit object crashes (county-wide)
- Annual number of overturned vehicle crashes (county-wide)
- Annual number of crashes with a primary collision factor of unsafe speed (county-wide)
- Annual number of crashes with a primary collision factor of driving or bicycling under the influence of alcohol or drugs (county-wide)

- Investments made in roadway safety countermeasures (e.g. dollars spent, grants pursued, partnerships developed)
- Investments made in education and enforcement strategies (e.g. dollars spent, grants pursued, partnerships developed)
- Coordination with other local agencies and/or safety partners (e.g. meetings held, projects pursued)
- Opportunities provided for citizen engagement (e.g. meetings held, public campaigns launched)
- Coordination between first responders and Fresno County Office of Emergency Services staff (e.g. meetings held, programs implemented, strategies deployed)

As part of plan implementation, the County will identify a process for annually tracking these performance measures to support future updates to this roadway safety plan.

DATA SUMMARY

The primary data sets used to inform the technical analyses for the County's local road safety plan were crash data and roadway network information. As noted below, future updates could incorporate traffic volume data if widely available for locations across the County. In addition, feedback from a publicly available survey was documented for consideration in identifying issues and improvement strategies.

Public Survey Feedback

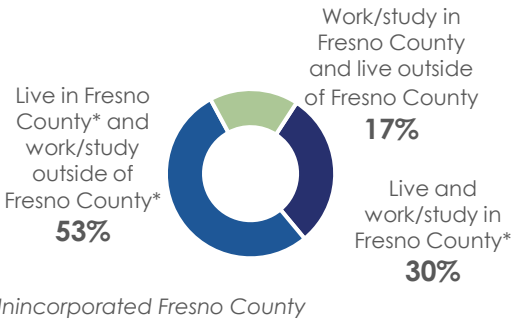
Toole Design Group worked with Fresno COG to develop an online survey and interactive webmap to provide the opportunity for public engagement on the LRSP. The goal was to collect both general and geographically specific feedback on safety problems, desired safety improvements in jurisdictions that are part of the MLRSP, as well as voluntary demographic information for Title IV reporting. Both activities were open from August 16, 2021 to September 20, 2021 and sought public feedback on spatial patterns of traffic safety concerns and desired improvements.

As the primary open public engagement opportunity during MLRSP development, the survey and interactive webmap served a crucial role in illuminating the community's traffic safety concerns and desired traffic safety improvements. Below is a summary of key findings from the online survey and interactive webmap specific to the unincorporated portions of Fresno County. More information on the methodology and overall findings of the survey are provided in *Appendix A*.

47
PEOPLE RESPONDED

47
LOCATIONS IDENTIFIED

WHERE PARTICIPANTS WORK AND LIVE



*Unincorporated Fresno County

MOST COMMON SAFETY CONCERNS

- Crashes or near misses happen here
- Aggressive driving or speeding
- Lack of safe places to walk, bike, or wait for bus

- The survey asked respondents to provide input on the top road safety improvements needed in their communities. While the survey prompted participants to pick three improvements, some selected more than three responses. A total of 150 responses were received for Unincorporated Fresno County from 47 participants, with the most common desired improvement types including:
  - Maintenance of existing roads and streets (33 responses)
  - Rural road improvements to prevent run-off-road crashes (29 responses)
  - Bike lanes/bikeways (18 responses)
  - Street lighting (16 responses)
  - Traffic signals (15 responses)
- Participants dropped points in the webmap in specific locations across Fresno County where they experienced road safety concerns. When leaving a point, participants could select from a list of traffic safety concerns and the kinds of travel impacted, with the ability to select as many responses as applicable. A text box gave participants the option to note what they think would make the location safer. A total of 47 locations were identified in Unincorporated Fresno County, with the following traffic safety concerns most common:
  - Crashes or near misses happen here (30 responses)
  - Aggressive driving or speeding (21 responses)
  - Lack of safe places to walk, bike, or wait for bus (15 responses)
  - Lack of safe opportunities to cross the street (12 responses)
  - Poor lighting or poor visibility (10 responses)
- The survey asked participants where they live and work or study, with the option to select either outside of Fresno County or from a list of jurisdictions within the County. The participants who selected Unincorporated Fresno County included:
  - 14 who live and work/study in Unincorporated Fresno County
  - 25 who live in Unincorporated Fresno County and work/study outside of Unincorporated Fresno County
  - 8 who work/study in Unincorporated Fresno County and live outside of Unincorporated Fresno County

Crash Data

Kittelson worked with Fresno COG to assemble crash data for Unincorporated Fresno County using the Statewide Integrated Traffic Records System (SWITRS) database, supplemented with location information from the Transportation Injury Mapping System (TIMS) database maintained by SafeTREC at the University of California, Berkeley. Throughout this report, crashes are associated with a jurisdiction based on the reporting officer's assessment of location. Some crashes may occur at or near jurisdiction boundaries, especially along state routes bordering incorporated areas of the County.

The crash database represents the time period from January 1, 2015 through December 31, 2019 and includes reported crashes that occurred on public streets. Within the assembled regional crash database, a total of 18,314 reported crashes are located in Unincorporated Fresno County. Crash severity is coded according to the highest degree of injury exhibited, and the data used for this analysis includes the following coded severity levels (listed in descending order):

- Fatal: death from injuries sustained in the crash.
- Severe Injury: Injuries include, for example, broken bones, severe lacerations, or other injuries that go beyond the reporting officer's assessment of "other visible injuries."
- Other visible injury: An injury, other than those described above, that is evident to observers at the scene of the crash. For example, bruises or minor lacerations.
- Complaint of pain: Internal or other non-visible injuries. For example, a person limps or seems incoherent.
- Property damage only (PDO): No injuries sustained.

Roadway Network Data

Kittelson developed a linear referencing system of all public roadways using the Fresno County roadway centerline file. This dataset was updated to develop a measurement system based on the total road length (as determined by roadway name) to locate crashes to a specific mile point along the network. The master roadway network for the County was used to spatially analyze and prioritize specific locations within each local jurisdiction.

Traffic Volume Data

Traffic volume data was not consistently available at a sufficient level to be able to incorporate into the safety analysis. Future updates to the County's local road safety plan could incorporate traffic volume data, if available, to understand how crash frequency, severity, and type vary at different levels of traffic.

EXISTING ROADWAY SAFETY PERFORMANCE

The findings in this section are based on the crash database, which includes reported crashes from January 1, 2015 through December 31, 2019. It is organized as follows:

- Severity by Road User
  - Year, Month, and Weather
  - Collision Type
  - Location, Collision Type, and Severity
  - Primary Collision Factor
  - Lighting
  - Time of Day
- Pedestrian-involved Crashes
  - Year and Month
  - Pedestrian Action and Location
  - Lighting
- Bicyclist-involved Crashes
  - Collision Type
  - Primary Collision Factor
  - Lighting

All Road Users

This section includes analysis and findings for all reported crashes. Subsequent sections focus exclusively on crashes involving pedestrians and bicyclists.

SEVERITY BY ROAD USER

Table 28 presents reported crashes, organized by severity level and road user. Notable trends include:

- Pedestrians are overrepresented in fatal and severe injury crashes. Pedestrians are involved in approximately 1 percent of reported crashes but are involved in 6 percent of fatal/severe injury crashes.
- Bicyclists are also overrepresented in fatal and severe injury crashes. Bicyclists are involved in approximately 1 percent of reported crashes but 3 percent of fatal/severe injury crashes.

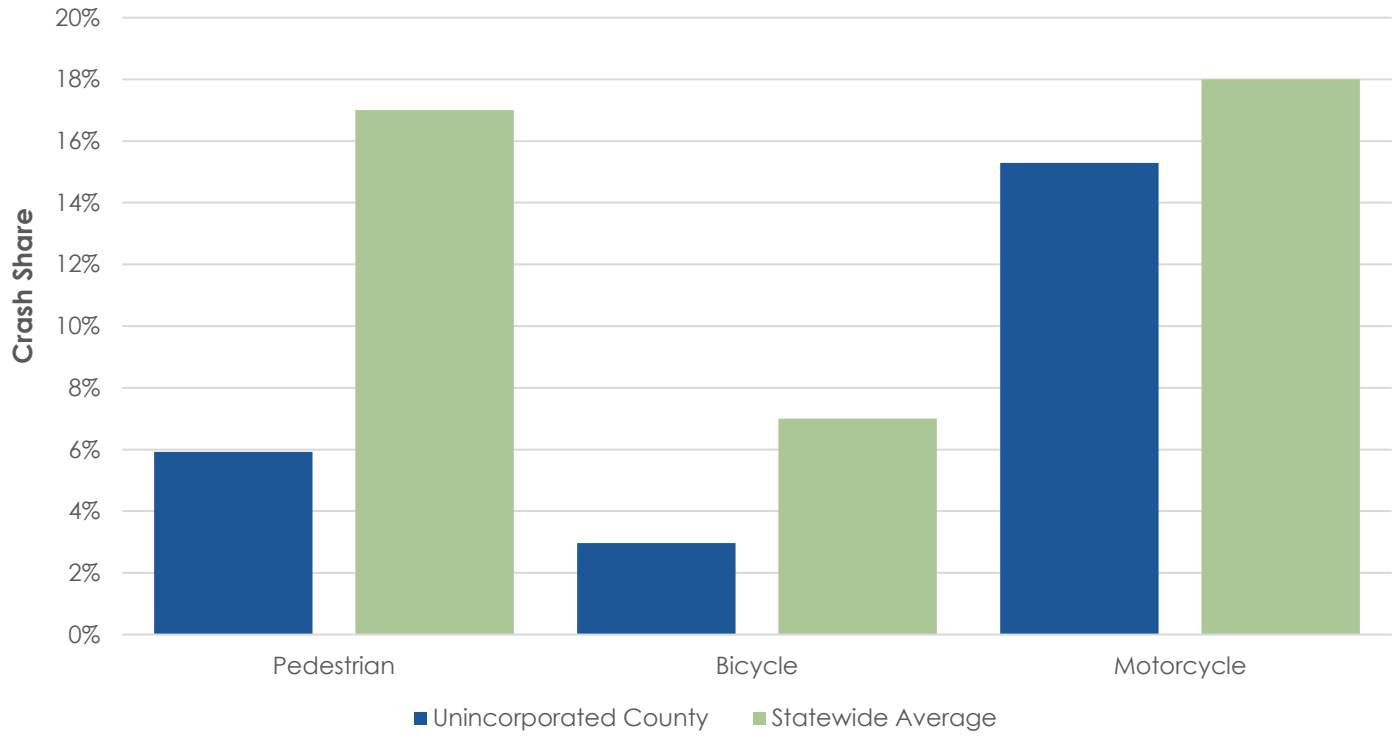
Table 28: Crash Severity by Road User Involved

Road Users Involved	Fatal (% of column)	Severe Injury (% of column)	Visible Injury (% of column)	Complaint of Pain (% of column)	Property Damage Only (% of column)	Total (% of column)
Pedestrian Involved	35 (10%)	39 (4%)	42 (2%)	24 (1%)	4 (0%)	144 (1%)
Bicycle Involved	14 (4%)	23 (3%)	51 (2%)	29 (1%)	11 (0%)	128 (1%)
Vehicle Only or Vehicle-Fixed Object	308 (86%)	830 (93%)	2,348 (96%)	3,566 (98%)	10,990 (100%)	18,042 (98%)
Reported Crashes	357 (100%)	892 (100%)	2,441 (100%)	3,619 (100%)	11,005 (100%)	18,314 (100%)
Severity Share of Reported Crashes	2%	5%	13%	20%	60%	100%

Source: SWITRS, TIMS, Kittelson, 2021.

The California Strategic Highway Safety Plan (SHSP)includes 16 challenge areas to focus statewide resources and efforts. Three of those challenge areas are crashes involving pedestrians, bicyclists, and motorcyclists. The SHSP analyzed the share of fatal and severe injury crashes involving each of these road users. Figure 58 compares crash trends in Unincorporated Fresno County to the statewide trends reported in the SHSP. Unincorporated Fresno County fatal/severe crashes share for pedestrian, bicycle, and motorcycle were equal to or less than the statewide average fatal/severe crash share.

Figure 58: Unincorporated Fresno Fatal and Severe Crash Shares by Road Users Compared to Statewide Trends

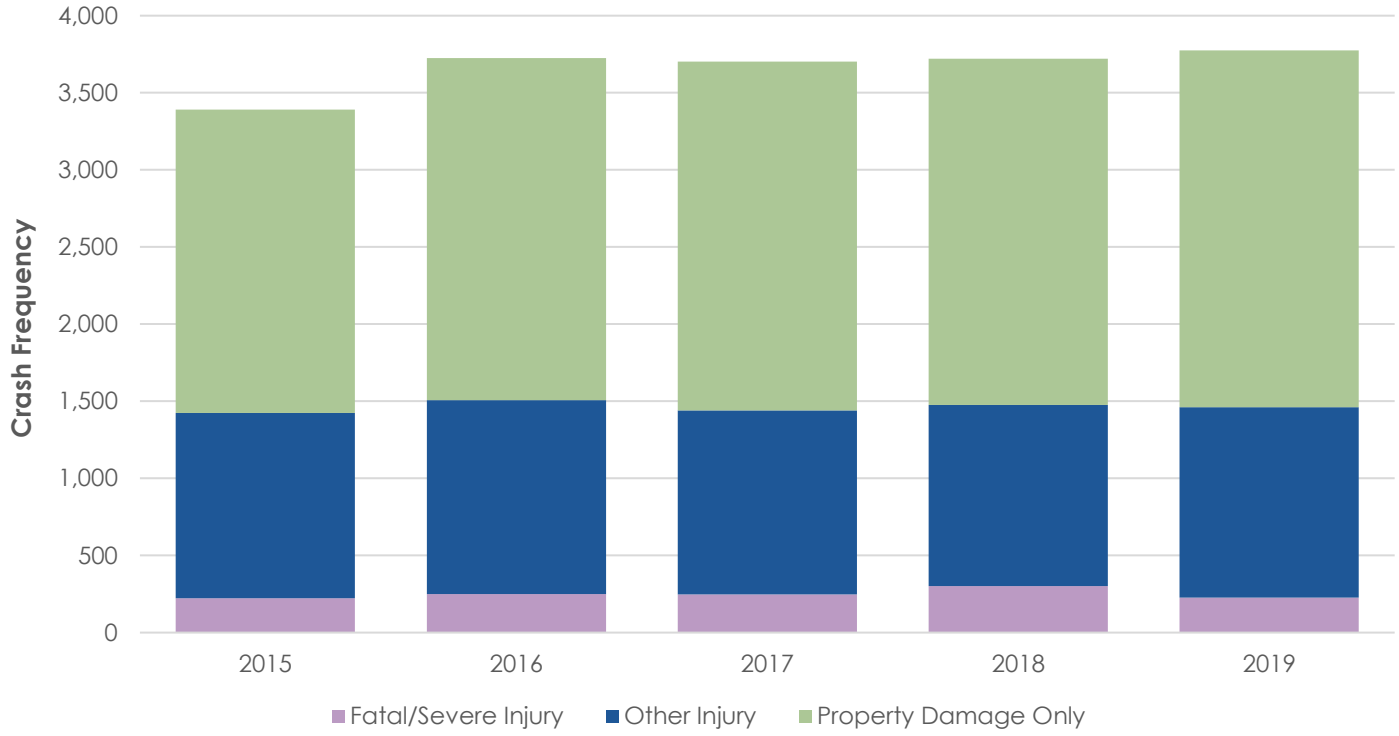


Source: City of Fresno, SWITRS, TIMS, Kittelson, 2021.

YEAR, MONTH, AND WEATHER

Figure 59 shows year-over-year trends in the data by severity. The total number of crashes each year has been relatively steady, with an average of 3,663 annual crashes and 250 fatal/severe injury crashes annually. Fluctuations from a single year to the next tend to represent the degree of randomness in crash occurrence and are not necessarily indicative of an overall trend.

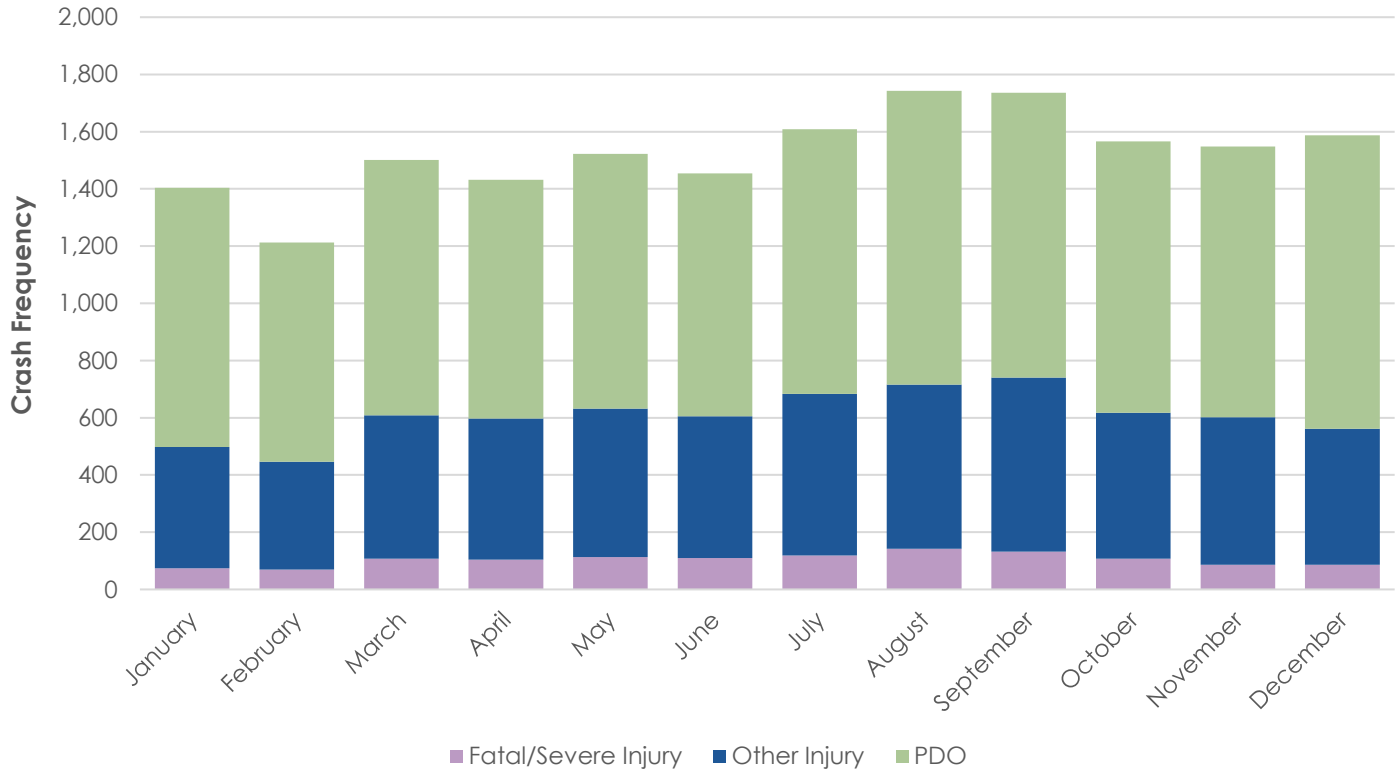
Figure 59: Year-over-Year Trends in Crash Data by Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes..

Figure 60 presents the total crashes by month for the crash database. On average, 1,526 crashes occurred per month. The lowest number of crashes were reported in February and January and the highest number of crashes were reported in August and September.

Figure 60: Crashes by Month and Severity

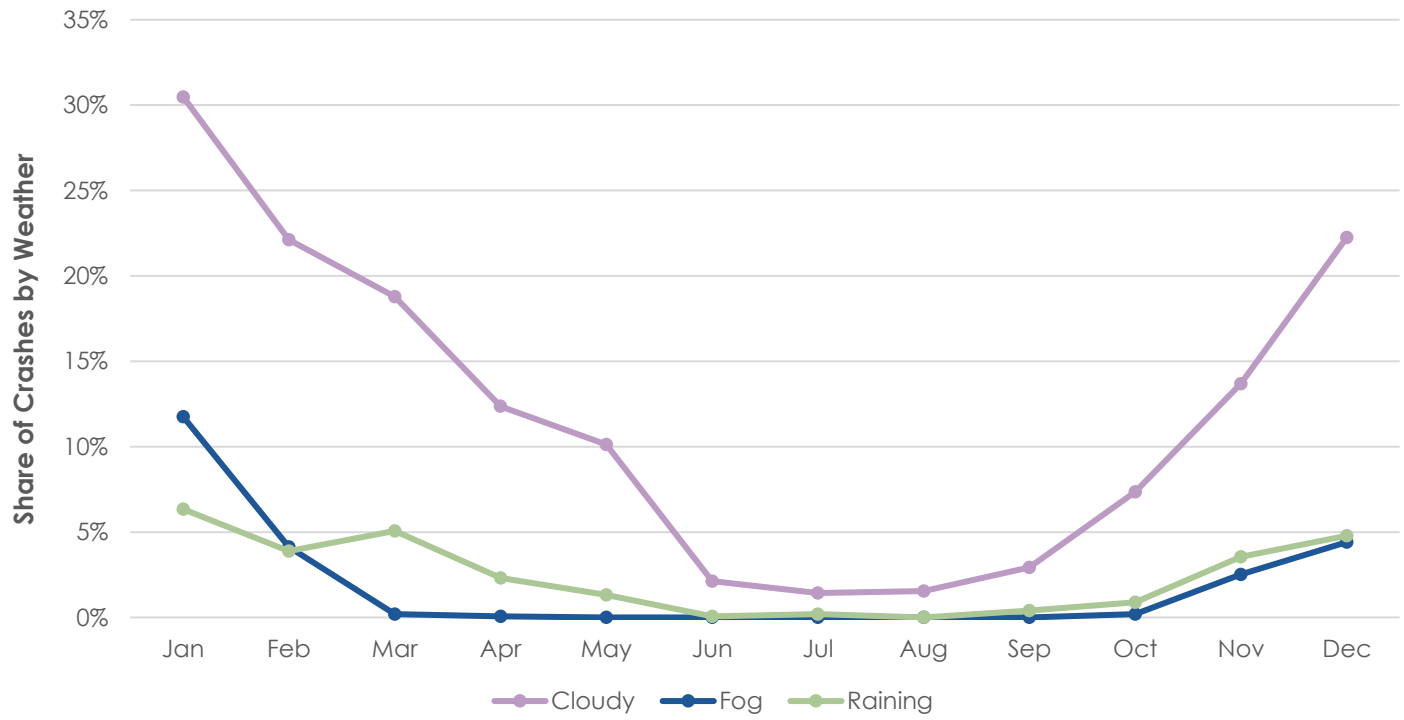


Source: SWITRS, TIMS, Kittelson, 2021
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

Figure 61 illustrates crashes by month and weather conditions. The most common weather condition, clear weather, is not shown in the chart below to highlight weather's factor on crash trends.

- Crashes recorded to have occurred during fog, cloudy conditions, and/or raining conditions are at the lowest share of crashes in the months of June to August and increase through October to March.
- Crashes recorded to have occurred in foggy conditions peak in the winter months (November through February). This is the case in January and February as well even though other collision types and total reported crashes in January and February tend to decrease relative to other months in the year.

Figure 61: Crashes by Month and Weather Condition



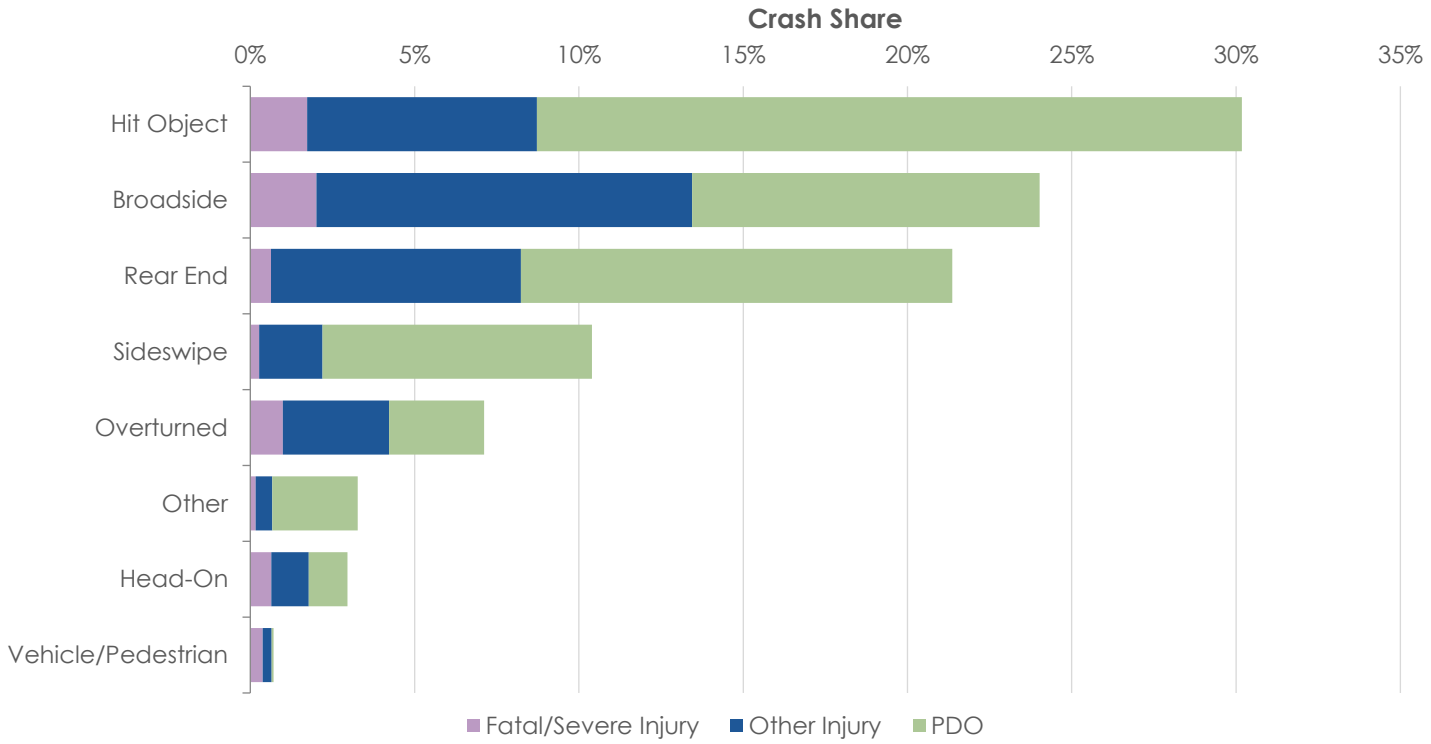
Source: SWITRS, TIMS, Kittelson, 2021.
Note: Only select conditions shown to improve legibility for less frequent weather conditions.

COLLISION TYPE

Reported collision type gives an indication of the movements most frequently involved in crashes and in severe outcomes. Figure 62 reports the most frequent reported collision types by severity.

- Among total reported crashes, the top three most frequent collision types are **hit object** (30 percent), **broadside** (24 percent), and **rear end** (21 percent). These three collision types account for 75 percent of reported crashes in the unincorporated county.
- Among fatal/severe injury crashes, the top three collision types are **broadside** (30 percent), **hit object** (25 percent), and **overturned** (14 percent) These three collision types account for 69 percent of all fatal/severe injury crashes in the unincorporated county.

Figure 62: Crashes by Collision Type by Severity



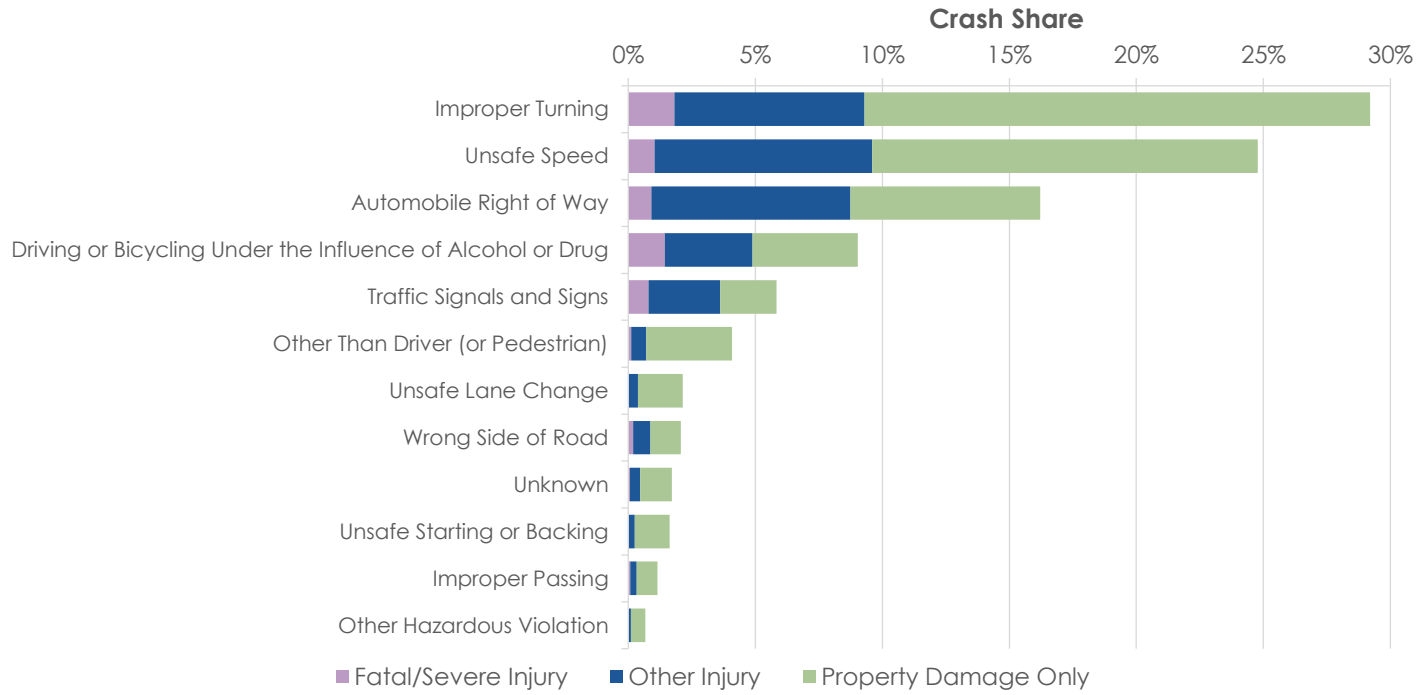
Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

PRIMARY COLLISION FACTOR

Reporting officers identify a primary collision factor (PCF) for each crash. It is up to the officer's judgement and information available at the scene for them to select the factor that is most relevant. Officers select one from among a list of PCFs based on California Vehicle Code (CVC) and road user behavior. Figure 63 presents the most frequently cited PCFs.

- Among total reported crashes, the three most frequently reported PCFs are **improper turning**[28] (29 percent), **unsafe speed**[29] (25 percent), and **automobile right of way**[30] (16 percent). These three account for 70 percent of reported crashes.
- Among fatal/severe injury crashes, the three most frequently reported PCFs are **improper turning**[28] (27 percent), **driving or bicycling under the influence of alcohol and drugs**[31] (21 percent), and **unsafe speed**[29] (15 percent). These three account for 63 percent of reported fatal/severe crashes.

Figure 63: Crashes by Reported PCF



Source: SWITRS, TIMS, Kittelson, 2021.
Notes: PCFs constituting <1% excluded from chart to enhance legibility. Those PCFs include other equipment, hazardous parking, impeding traffic, lights, and brakes.
"Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

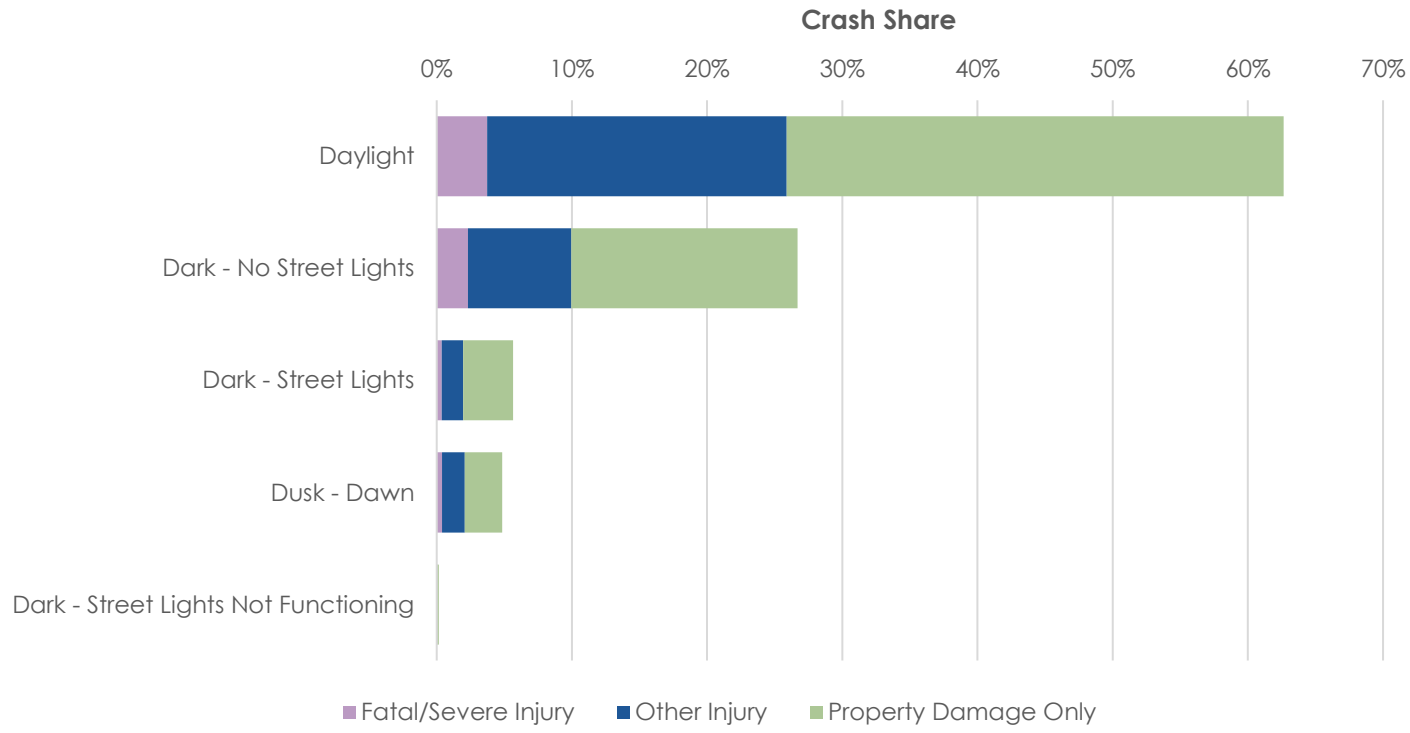
[28] Reported PCF based on CVC violation indicating a failure while turning from a direct course without reasonable safety or not signaling appropriately.
[29] Reported PCF based on CVC violation indicating unsafe speeding on a highway.
[30] Reported PCF based on CVC violation indicating a driver turning failed to yield right-of-way to oncoming traffic.
[31] Reported PCF based on CVC violation indicating driver was under the influence of alcohol.

LIGHTING

Figure 64 shows crashes by reported lighting condition and severity.

- Crashes that occurred in daylight conditions make up 63 percent of total reported crashes, and account for 55 percent of fatal and severe injury crashes.
- 164 fatal crashes occurred in the dark (46 percent of fatal crashes), of which 145 occurred where there were no streetlights.

Figure 64: Crashes by Lighting and Severity

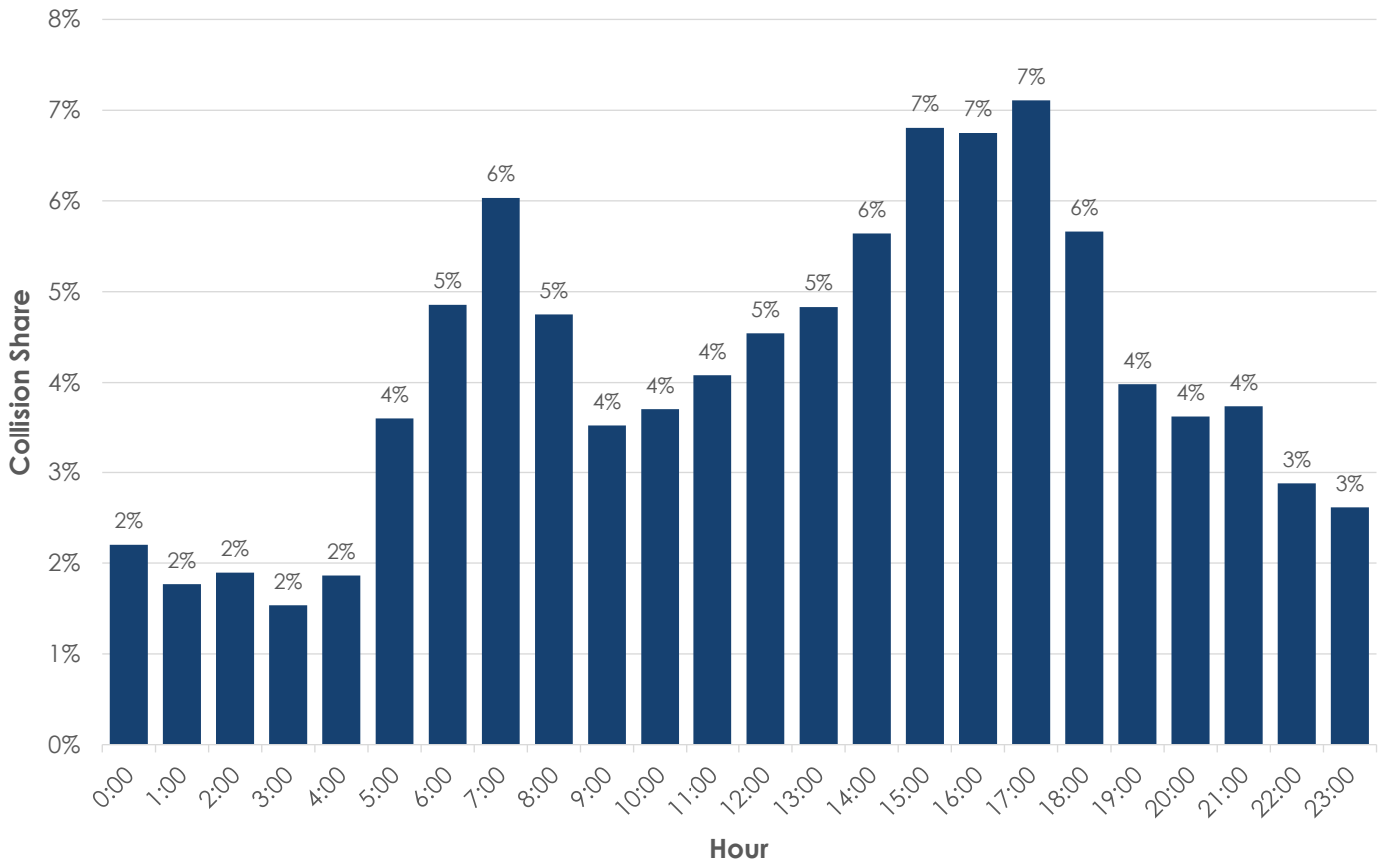


Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes.

TIME OF DAY

Figure 65 shows crashes by time of day. Crashes appear to have a higher share in two general times of day. The morning appears to show a peak from 5 AM to 9 AM with the highest number of morning crashes in the 7 AM hour. In the afternoon, crashes tend to be more frequent from 12 PM to 7 PM with the peak from 3 PM to 6 PM.

Figure 65: Crash Share by Time of Day



Source: SWITRS, TIMS, Kittelson, 2021.
Note: 2% of crashes are unknown time.

Pedestrians

This section focuses exclusively on reported crashes involving pedestrians. Table 29 shows the distribution of pedestrian crashes by severity. Of the 144 reported pedestrian crashes, 51 percent resulted in death or severe injury. Pedestrian fatal/severe injury crashes are 6 percent of total reported fatal/severe crashes, compared to1 percent of total reported crashes.

Table 29: Severity by Pedestrians Involved

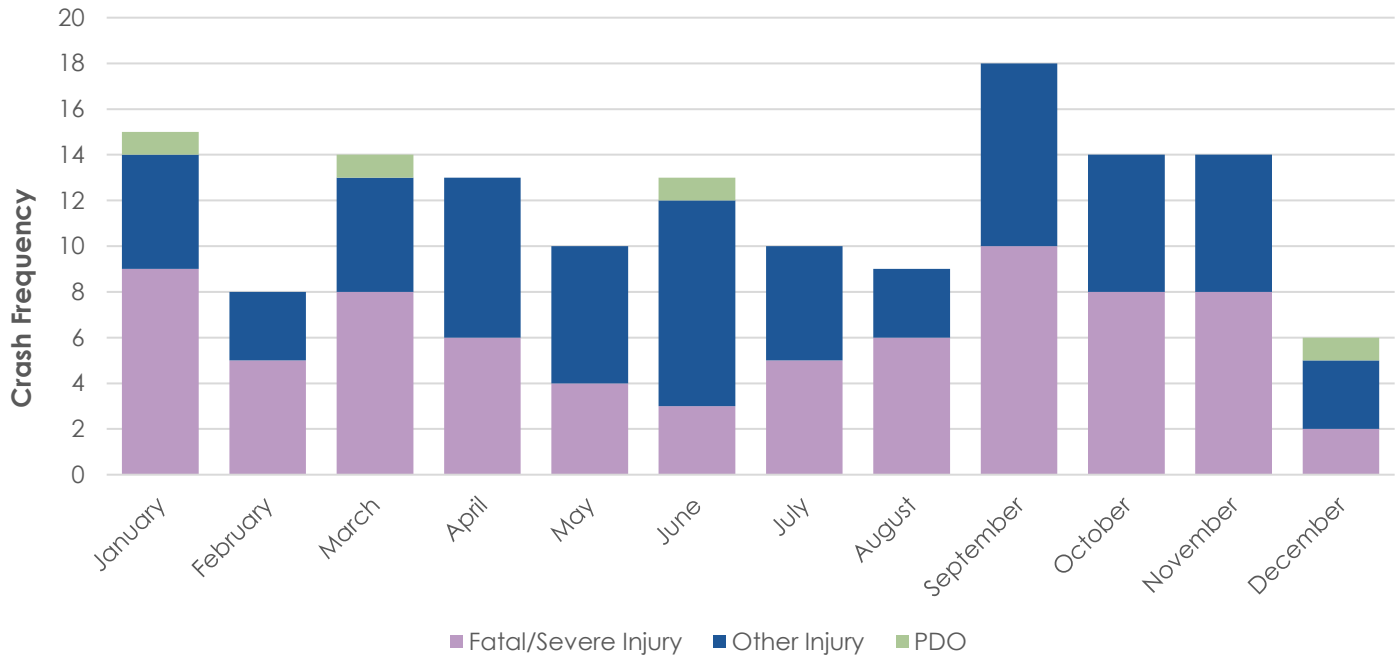
	Fatal (% of Total)	Severe Injury (% of Total)	Visible Injury (% of Total)	Complaint of Pain (% of Total)	Property Damage Only (% of Total)	Total
Pedestrian Involved	35 (24%)	39 (27%)	42 (29%)	24 (17%)	4 (3%)	144 (100%)

Source: SWITRS, TIMS, Kittelson, 2021.

SEVERITY AND MONTH

Figure 66 presents pedestrian crashes organized by month and severity with a monthly average of 12 crashes per month. December and February appear to be noticeably lower than the average while the highest number of crashes per month occurred in September. However, these trends should be interpreted with caution: fluctuations from a single month to the next tend may represent a degree of randomness in crash occurrence.

Figure 66: Pedestrian Crashes by Month and Severity



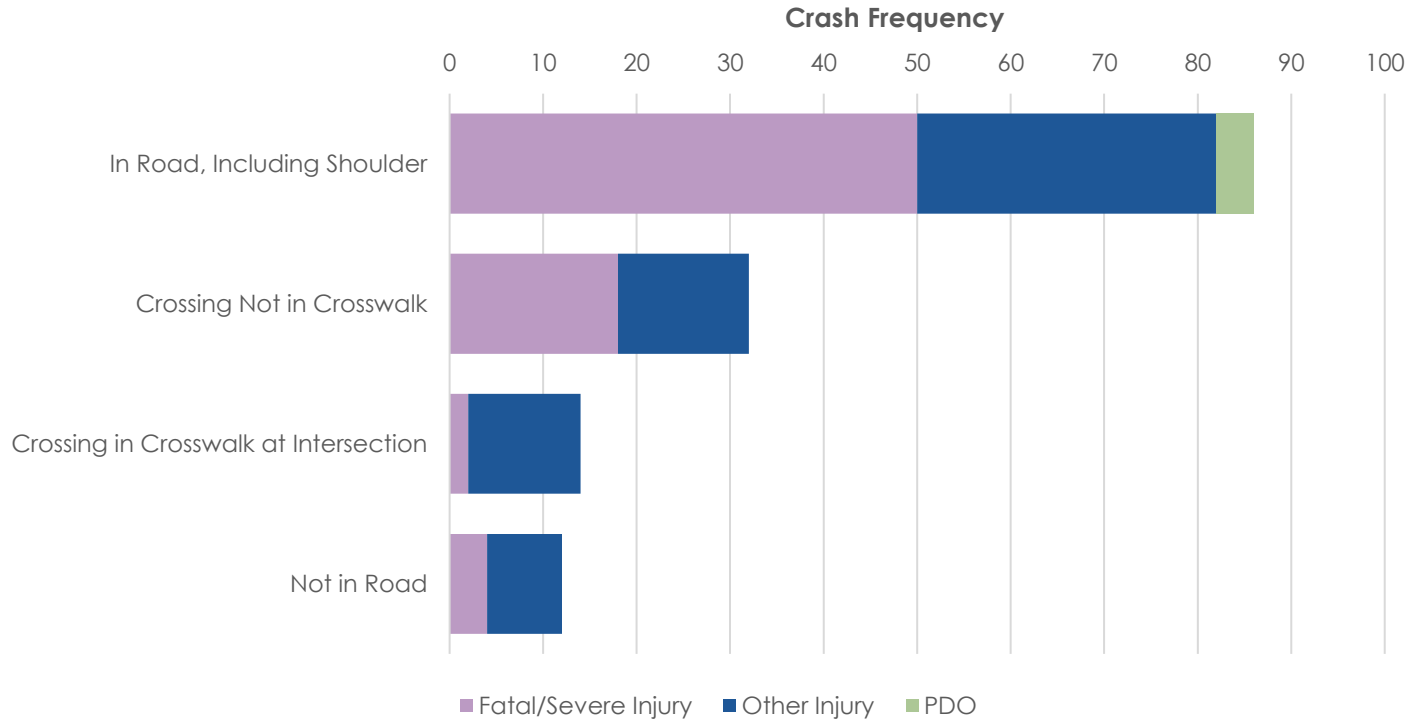
Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

PEDESTRIAN ACTION AND LOCATION

For pedestrian crashes, data are recorded according to the reporting officer's best judgment about the pedestrian's action and location preceding the crash. Figure 67 reports these trends in unincorporated Fresno County.

- Among fatal/severe injury pedestrian crashes, 68 percent occurred while a pedestrian was in the road (including the shoulder). Pedestrian crashes with this action account for 60 percent of total pedestrian crashes.
- The second and third most common pedestrian actions preceding a crash included crossing not in a crosswalk (22 percent) and crossing in crosswalk at intersection (10 percent).

Figure 67: Pedestrian Crashes by Reported Action/Location and Severity

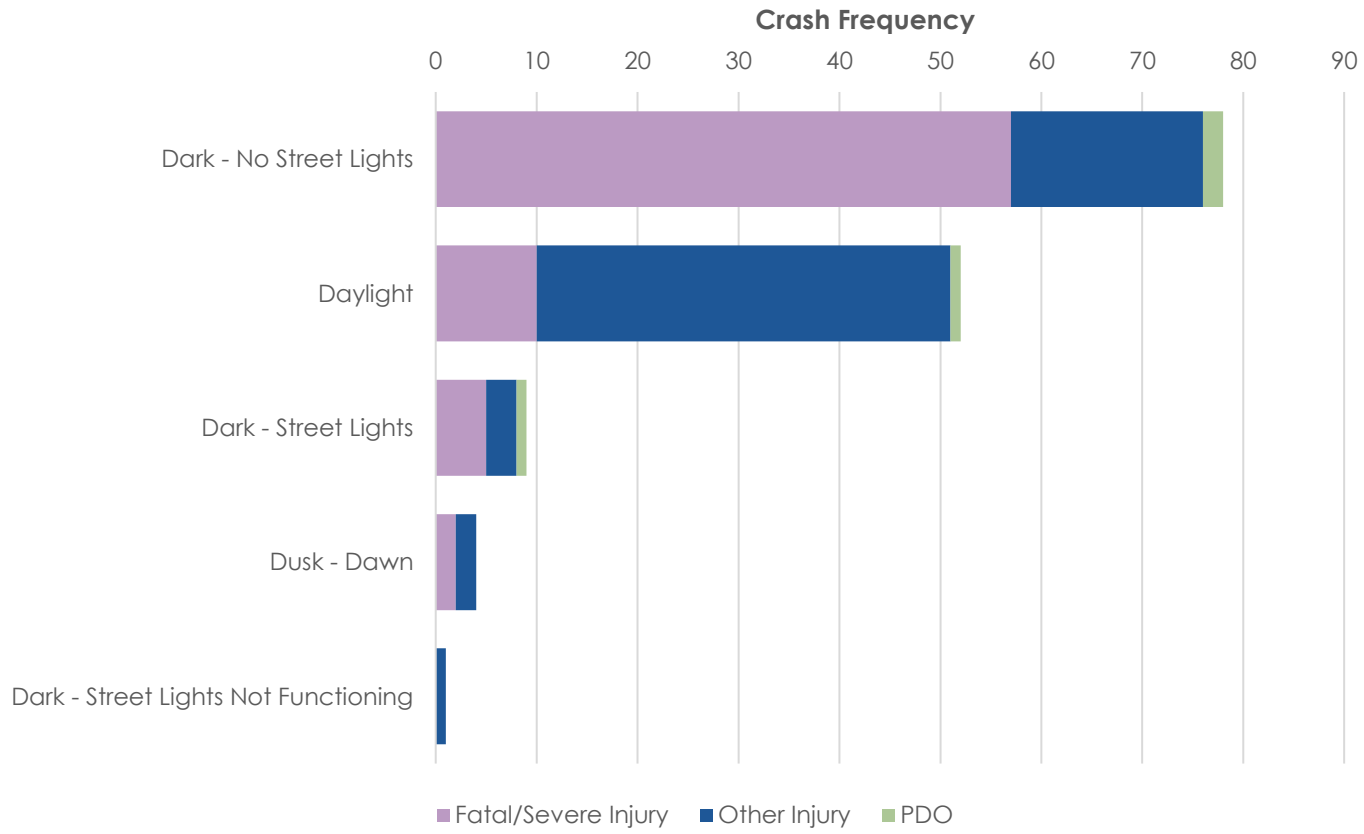


Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

LIGHTING

Figure 68 shows pedestrian crashes by reported lighting condition and severity within unincorporated Fresno County. Crashes that occurred in the dark with no streetlights make up 54 percent of total pedestrian crashes and make up 77 percent of fatal/severe injury pedestrian crashes.

Figure 68: Pedestrian Crashes by Lighting and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

Bicyclists

This section focuses exclusively on reported crashes involving bicyclists. Table 30 presents bicyclist-involved crashes in unincorporated Fresno County organized by severity level. Of the 128 bicyclist crashes in the County, 29 percent resulted in fatal/severe injury. Bicyclist fatal/severe injury crashes are 3 percent of total reported fatal/severe crashes, compared to 1 percent of total reported crashes.

Table 30: Bicycle User Involved Crashes by Severity

	Fatal (% of total)	Severe Injury (% of total)	Visible Injury (% of total)	Complaint of Pain (% of total)	Property Damage Only (% of total)	Total (% of total)
Bicycle Involved	14 (11%)	23 (18%)	51 (40%)	29 (23%)	11 (9%)	128 (100%)

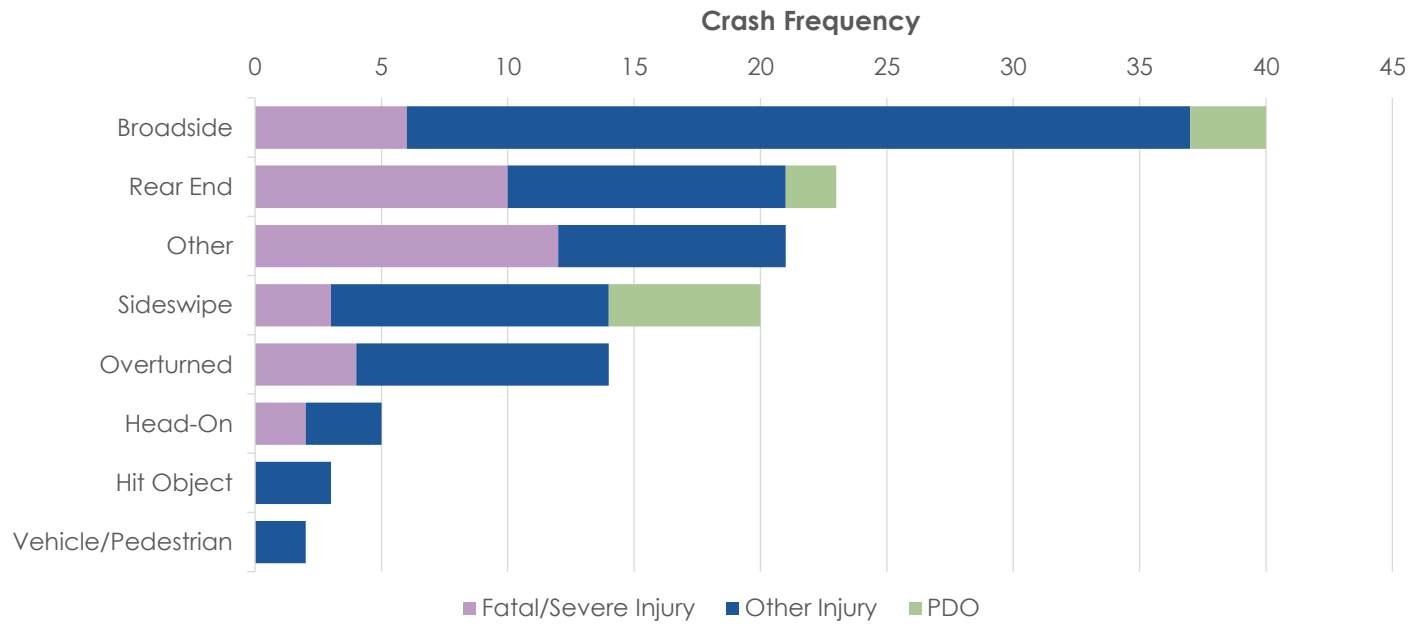
Source: SWITRS, TIMS, Kittelson, 2021.

COLLISION TYPE

Figure 69 presents reported bicycle crashes organized by collision type.

- The top two collision types among bicyclist crashes include **broadside** (31 percent) and **rear end** (18 percent). Crashes reported as **other** or not stated account for 16 percent of bicycle crashes.
- The top three fatal/severe collision types among bicyclist crashes are **other** (32 percent), **rear end** (27 percent), and **broadside** (16 percent).

Figure 69: Bicycle Crashes by Collision Type and Severity



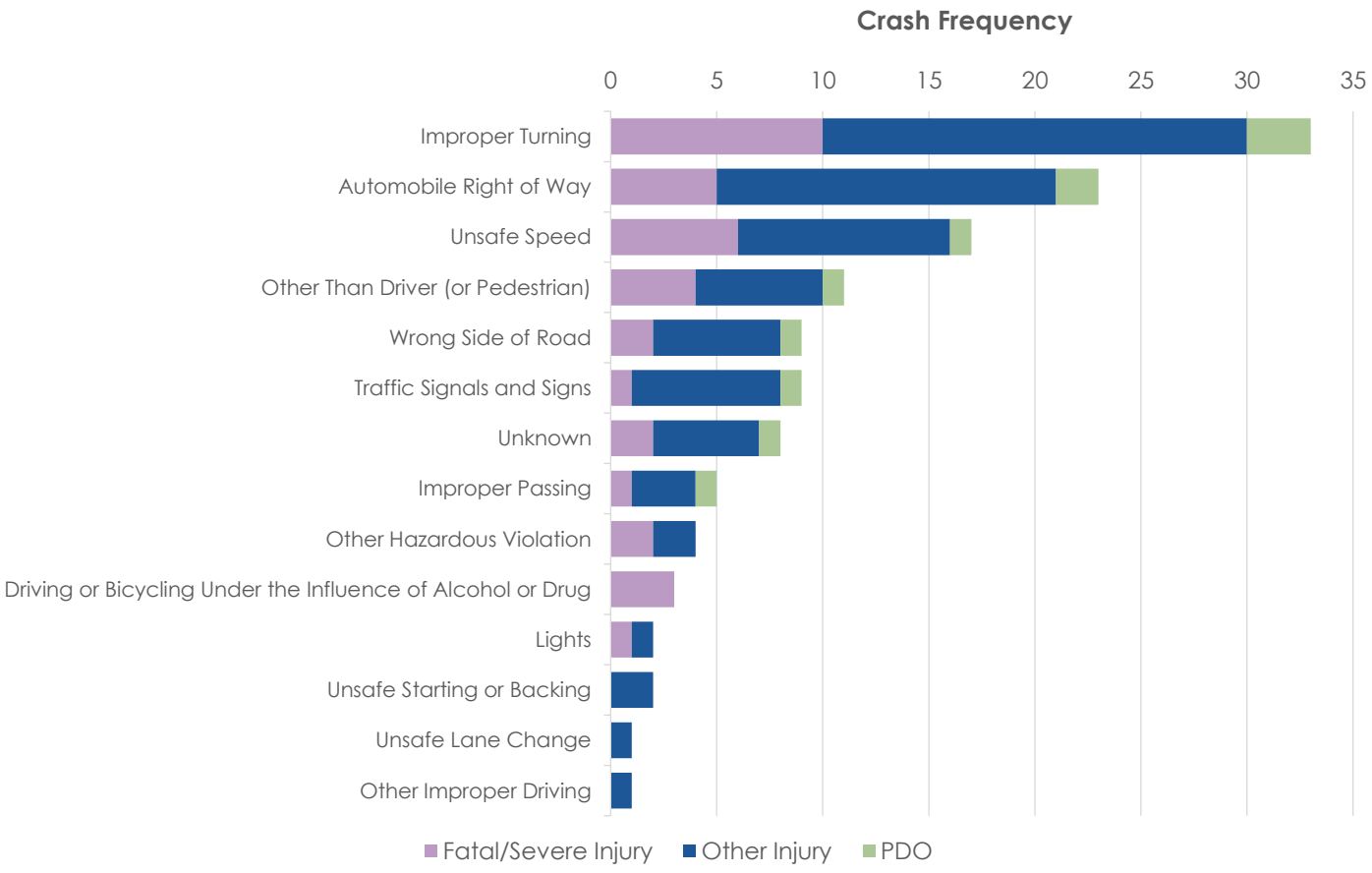
Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

PRIMARY COLLISION FACTOR

Figure 70 presents the reported PCF among bicycle crashes.

- The most frequently cited PCF was **improper turning**[32], which accounted for 26 percent of total bicycle crashes and 27 percent of total fatal/severe bicycle crashes.
- The other two most frequent PCFs among bicycle crashes include **automobile right of way**[33] (18 percent) and **unsafe speed**[34] (13 percent).

Figure 70: Bicycle Crashes by Reported PCF and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

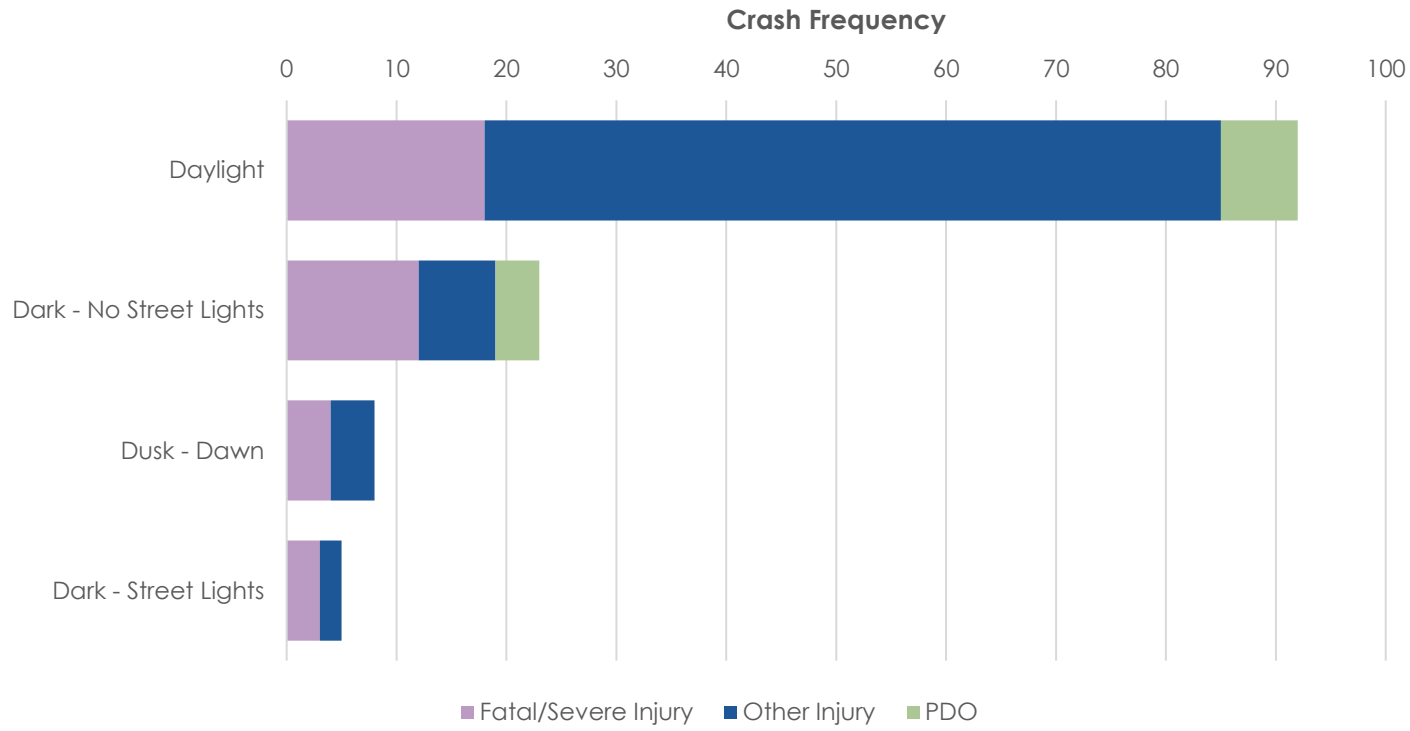
[32] Reported PCF based on CVC violation indicating a failure while turning from a direct course without reasonable safety or not signaling appropriately.
[33] Reported PCF based on CVC violation indicating a driver turning failed to yield right-of-way to oncoming traffic.
[34] Reported PCF based on CVC violation indicating unsafe speeding on a highway.

LIGHTING

Figure 71 presents bicycle crashes organized by lighting and severity.

- Most bicycle crashes (72 percent of those reported) occur in daylight.
- Bicycle crashes occurring in the dark account for 22 percent of reported bicyclist crashes but 41 percent of fatal/severe injury crashes.

Figure 71: Bicycle Crashes by Lighting and Severity



Source: SWITRS, TIMS, Kittelson, 2021.
Note: "Other injury" includes "Other visible injury" and "Complaint of pain" crashes. "PDO" = property damage only.

Priority Locations

Kittelson identified priority intersections and segments in unincorporated Fresno County using the annualized crash severity scores and excess predicted crashes described in the Data Summary and Analysis Approach sections (see the Introduction).

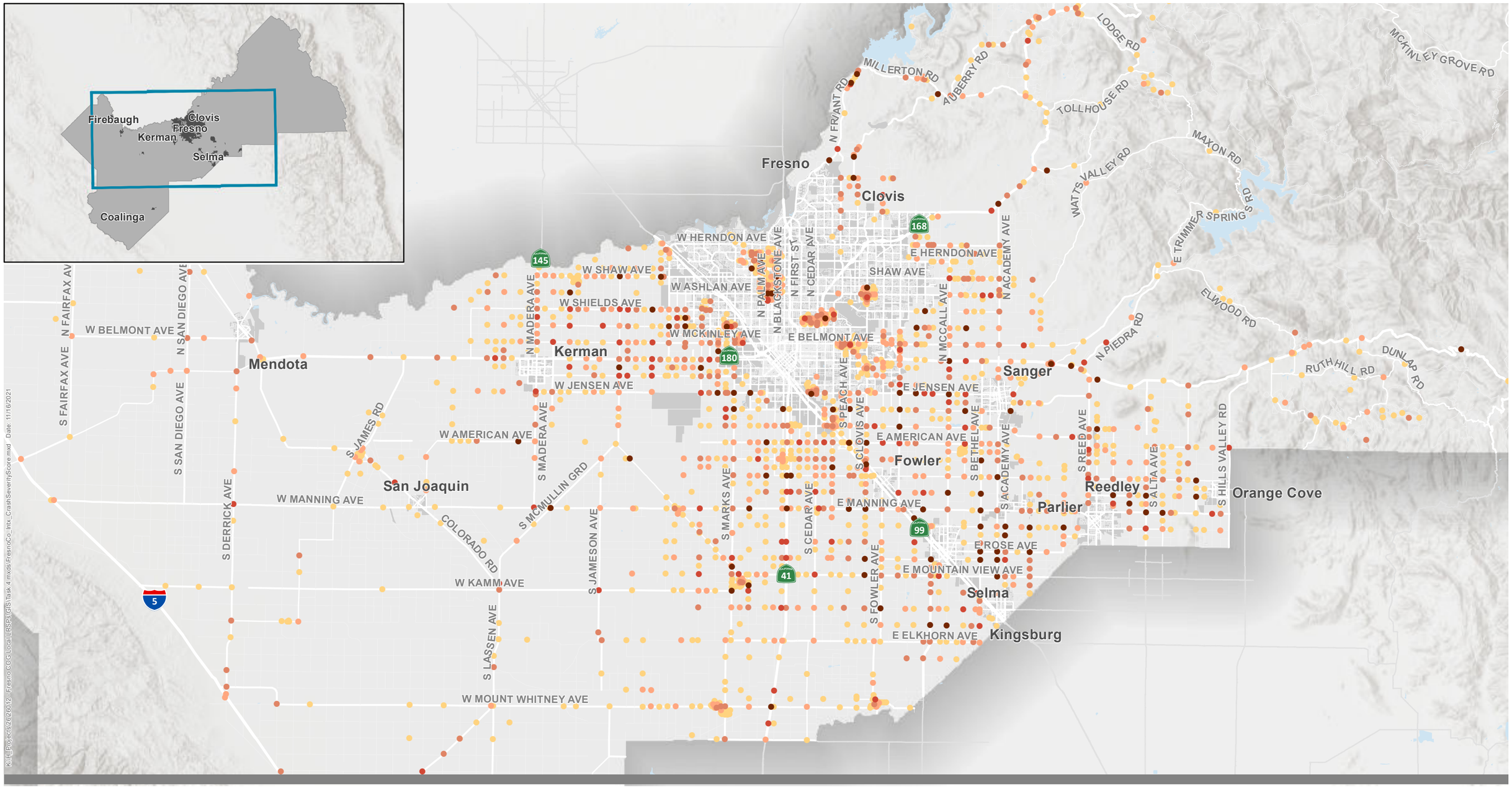
For intersection locations, the crash severity scores ranged from zero (no reported crashes during the five years) to 201.09. Figure 72.1 through Figure 72.4 show the results of the crash severity scoring. Figure 73.1 through Figure 73.4 show excess predicted crash scores by percentiles for intersection locations. For the half-mile roadway segments, the crash severity scores ranged from zero to 145.02. Crash severity score results for roadway segments are shown in Figure 74.1 through Figure 74.4. Excess predicted crash score results are shown in Figure 75.1 through Figure 75.4. Intersections or segments shown as not falling within one of the percentile breaks indicates there were no reported crashes at that location.

Table 31 presents the top twenty locations with the highest crash severity scores.

Table 31. Top 20 Locations based on Crash Severity Score

#	Location	Type	Crash Severity Score	Total Number of Crashes	Severity				
					Fatal	Severe Injury	Other Visible Injury	Com-plaint of Pain	PDO
1	LAC JAC AVE & DINUBA AVE	Unsignalized	201.09	15	0	5	3	3	4
2	FRANKWOOD AVE & CENTRAL AVE	Unsignalized	164.99	14	0	4	4	3	3
3	ACADEMY AVE & ADAMS AVE	Unsignalized	162.93	18	1	3	2	4	8
4	BETHEL AVE & DINUBA AVE	Unsignalized	157.25	49	1	2	7	20	19
5	AUBERRY RD & FRAZIER RD	Unsignalized	154.92	8	2	2	1	0	3
6	MILLERTON RD FROM MILLERTON LAKE ACCESS (WEST) TO SKY HARBOUR RD	Segment	145.02	21	2	2	3	4	10
7	AUBERRY RD FROM EAST OF OLD AUBERRY RD TO SOUTH OF OLD AUBERRY RD	Segment	144.23	18	1	3	5	0	9
8	KINGS CANYON RD WEST OF HILLS VALLEY RD	Segment	141.08	13	1	3	3	4	2
9	KEARNEY BLVD & CORNELIA AVE & MADISON AVE	Unsignalized	139.01	29	0	3	7	6	13
10	CLOVIS AVE & MOUNTAIN VIEW AVE	Unsignalized	137.94	19	1	2	8	5	3
11	BETHEL AVE & ROSE AVE	Unsignalized	135.54	25	1	2	3	11	8
12	CLOVIS AVE & NEBRASKA AVE	Unsignalized	133.24	20	0	3	6	4	7
13	MARKS AVE & JENSEN AVE	Unsignalized	132.02	19	2	1	6	3	7
14	AMERICAN AVE & GOLDEN STATE BLVD	Unsignalized	128.81	26	2	1	1	8	14
15	FRIANT RD & BELCHER	Unsignalized	128.36	15	0	3	4	4	4
16	BETHEL AVE & NEBRASKA AVE	Unsignalized	127.34	15	2	1	4	3	5
17	MCMULLIN GRD & MANNING AVE	Unsignalized	127.13	19	1	2	4	2	10
18	FRONTIER TRAIL LN & SAMPLE RD	Unsignalized	122.99	8	0	3	3	2	0
19	TEMPERANCE AVE & CENTRAL AVE	Unsignalized	121.12	13	1	2	1	3	6
20	TEMPERANCE AVE & JENSEN AVE	Signalized	120.58	34	0	4	4	11	15

Notes: All unsignalized intersections are classified as rural intersections. PDO = Property Damage Only.



Crash Severity Score

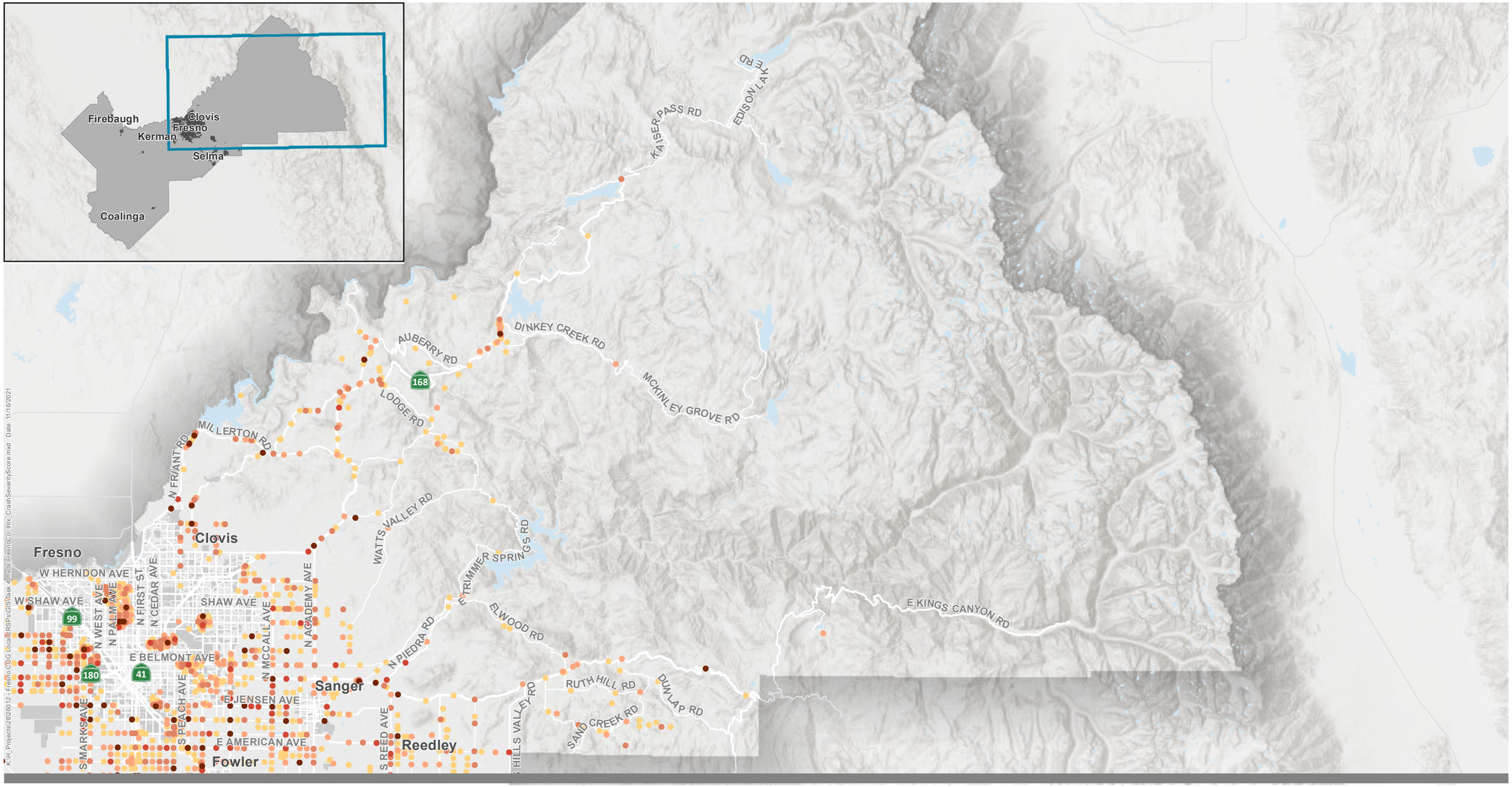
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 6 Miles

Figure 72.1

Intersection Crash Severity Scores
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



Crash Severity Score

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile

City Limits

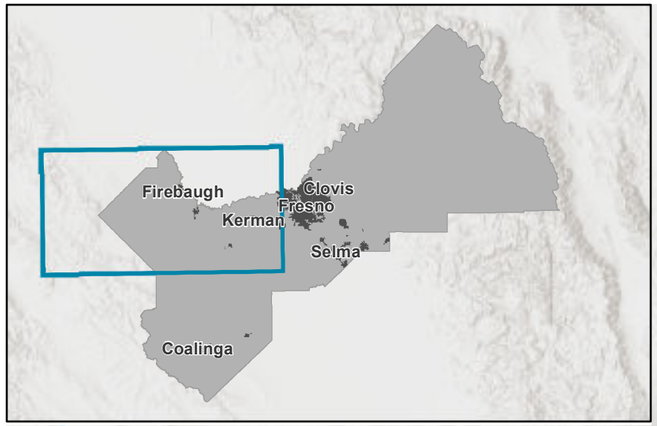
County Boundary

0 6 Miles

Figure 72.2

Intersection Crash Severity Scores
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



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Crash Severity Score

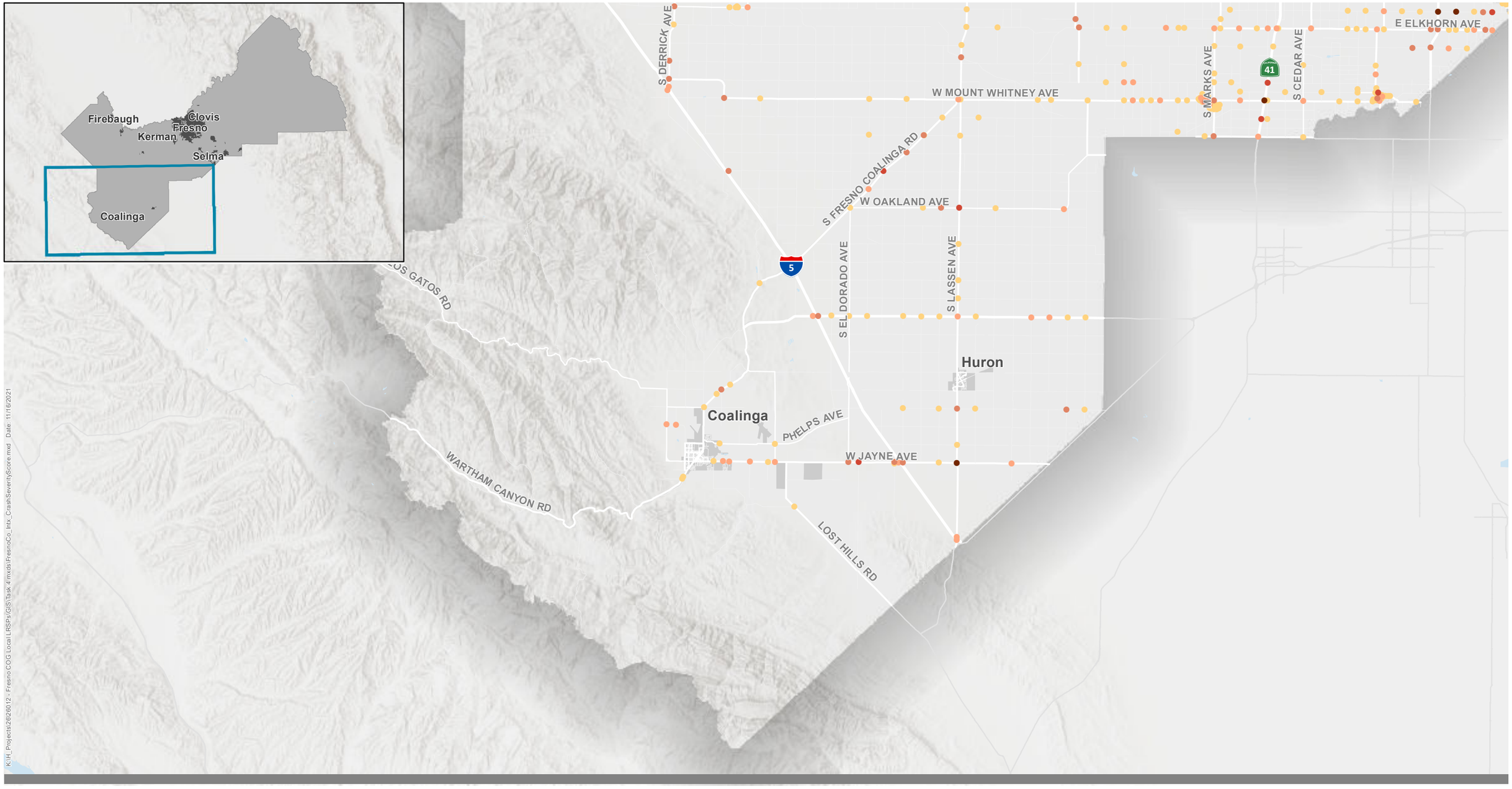
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 4.5 Miles

Figure 72.3

Intersection Crash Severity Scores
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



Crash Severity Score

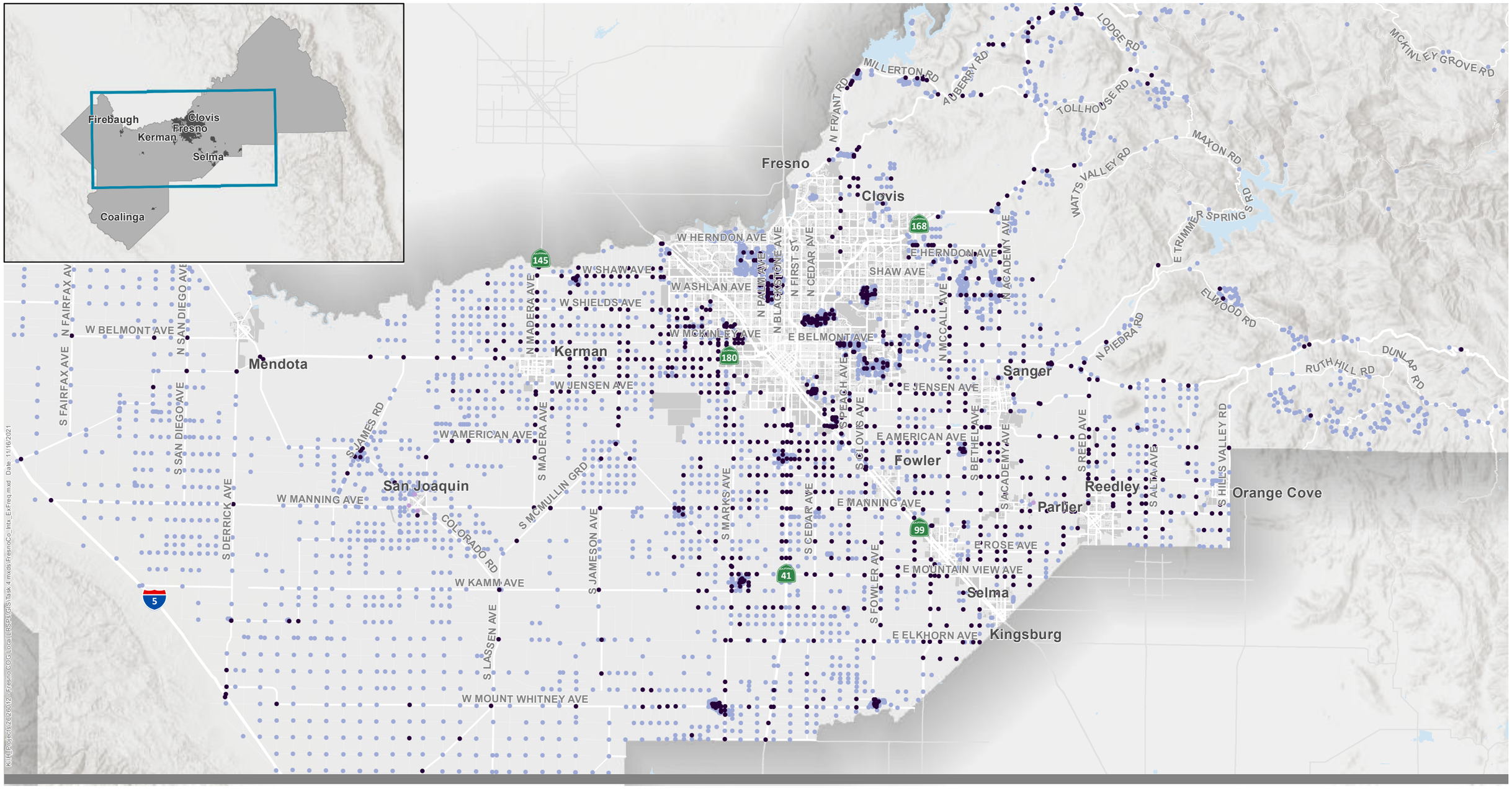
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 4.5 Miles

Figure 72.4

Intersection Crash Severity Scores Jurisdiction Results: Fresno County Fresno Council of Governments

KITTELSON & ASSOCIATES



Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile

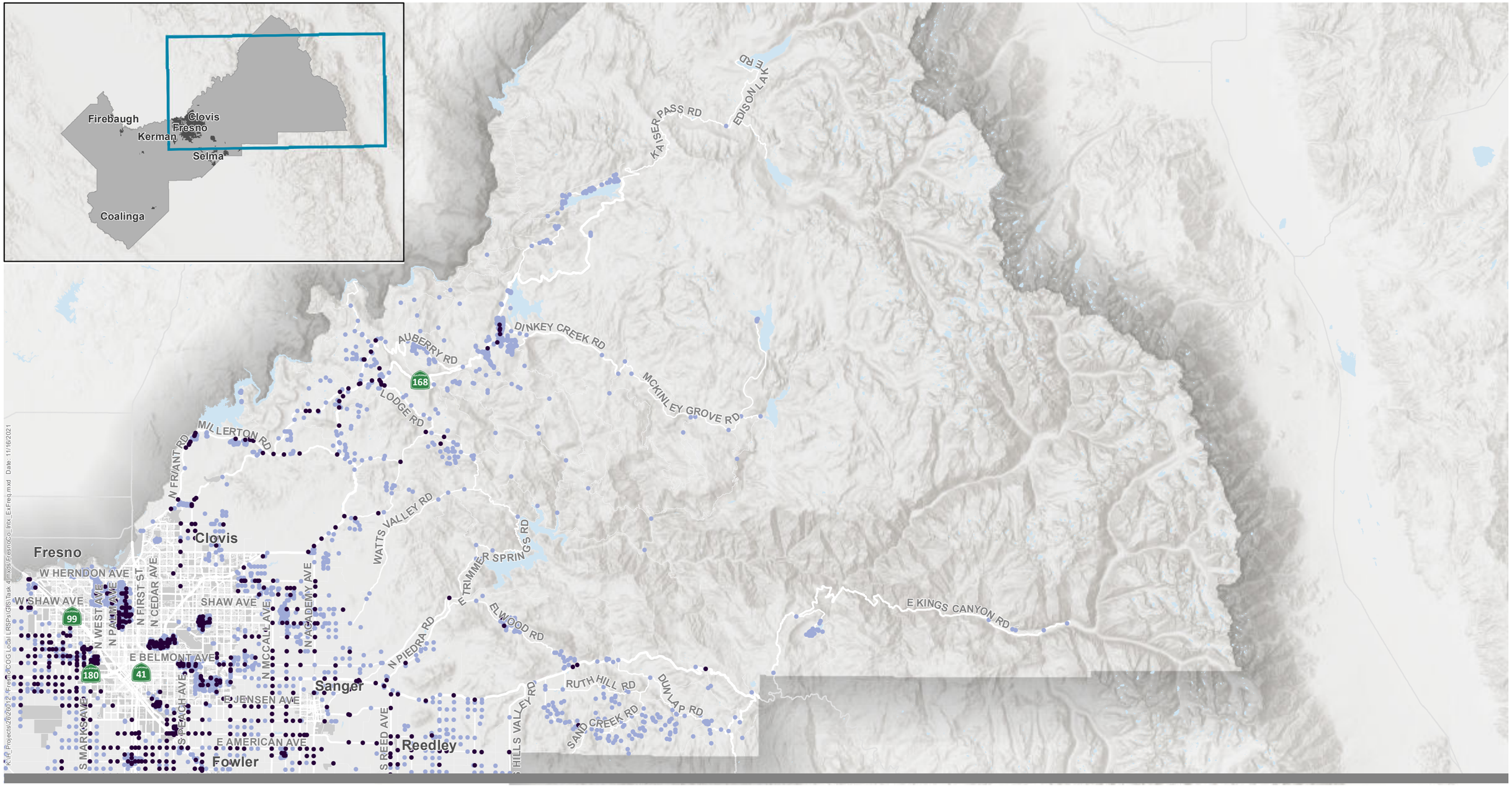
City Limits

County Boundary

Figure 73.1

Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile

City Limits

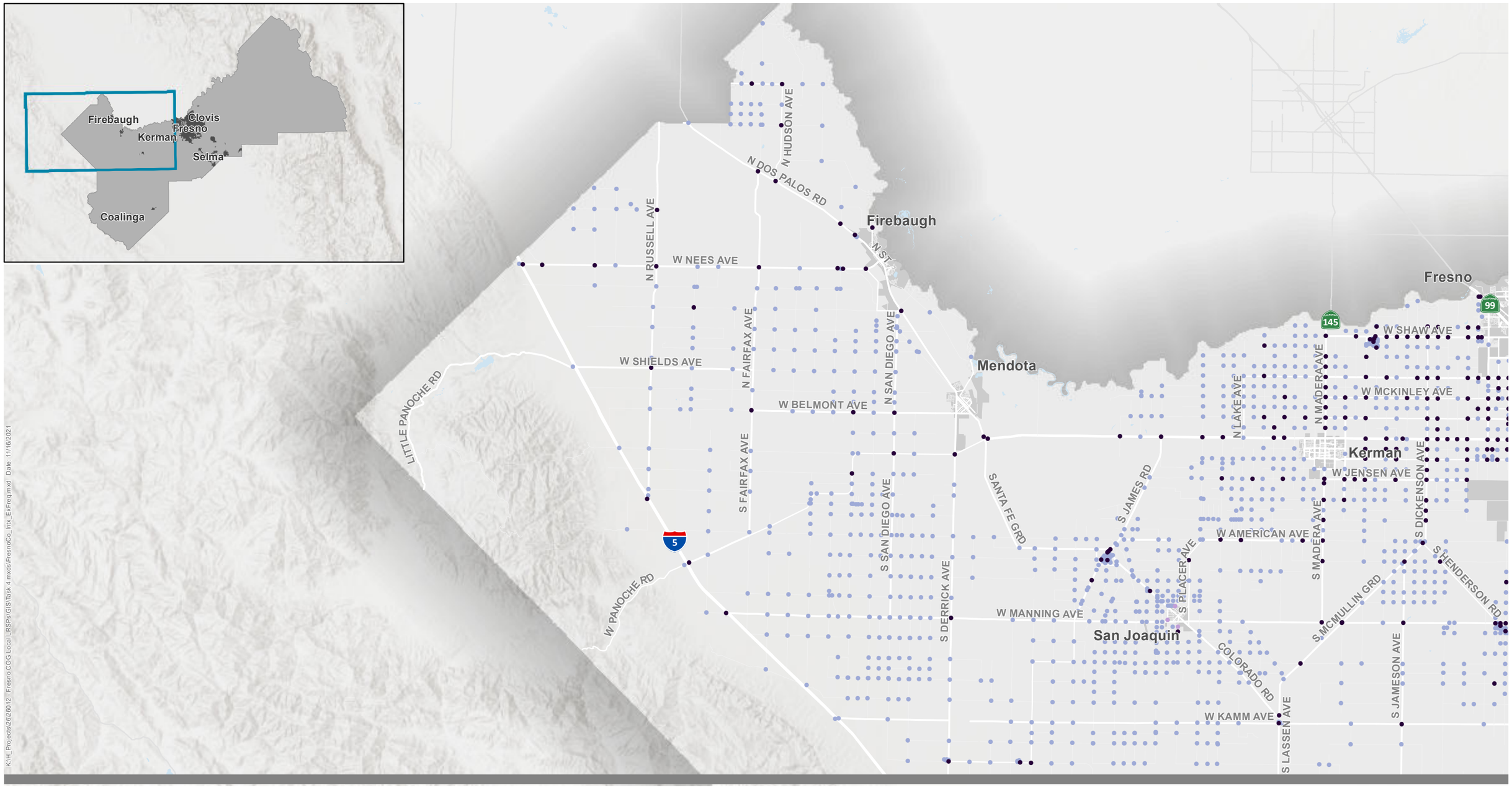
County Boundary

0 6 Miles

Figure 73.2

Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



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Excess Expected Frequency

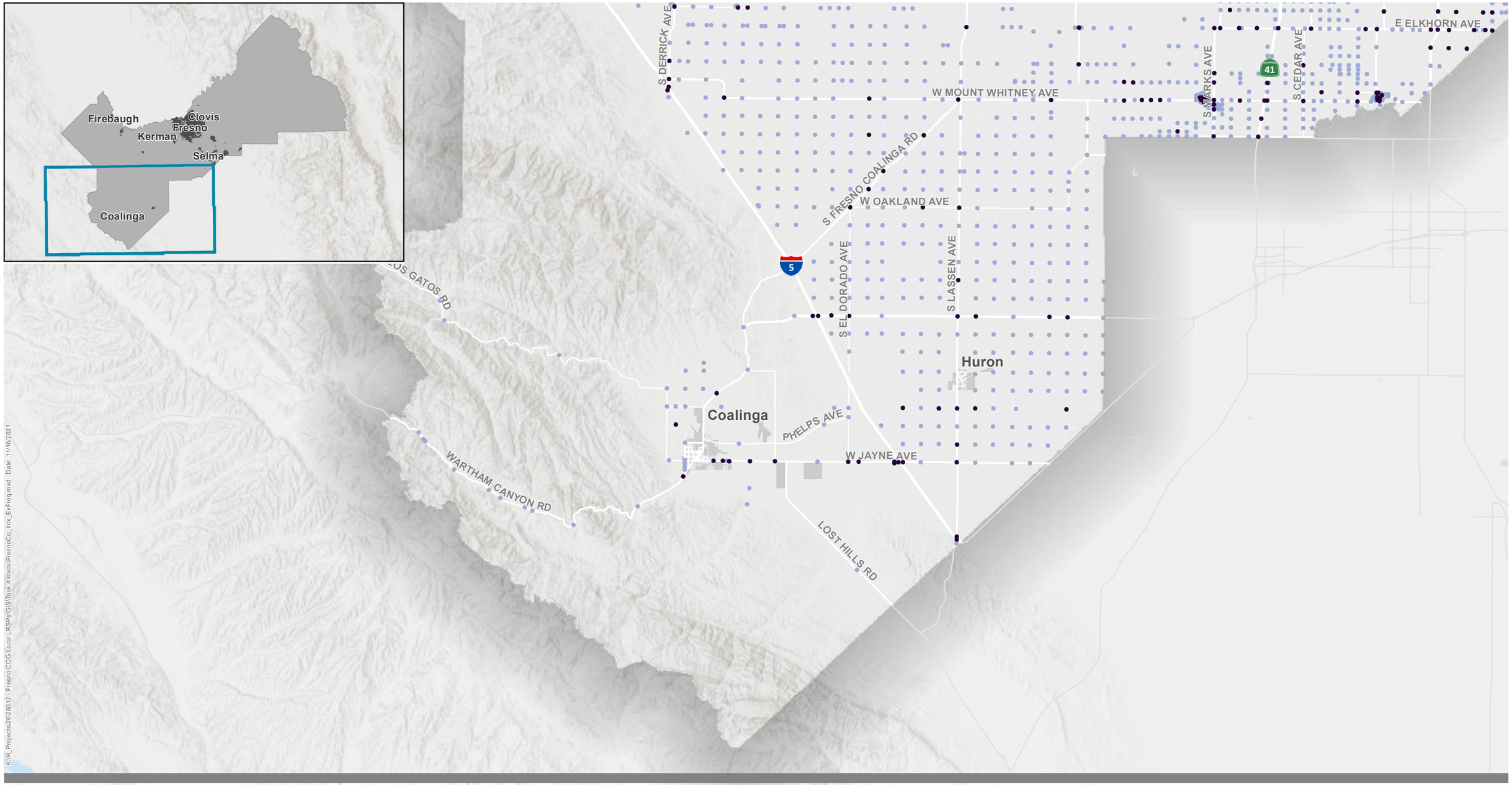
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 4.5 Miles

Figure 73.3

Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



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Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile

City Limits

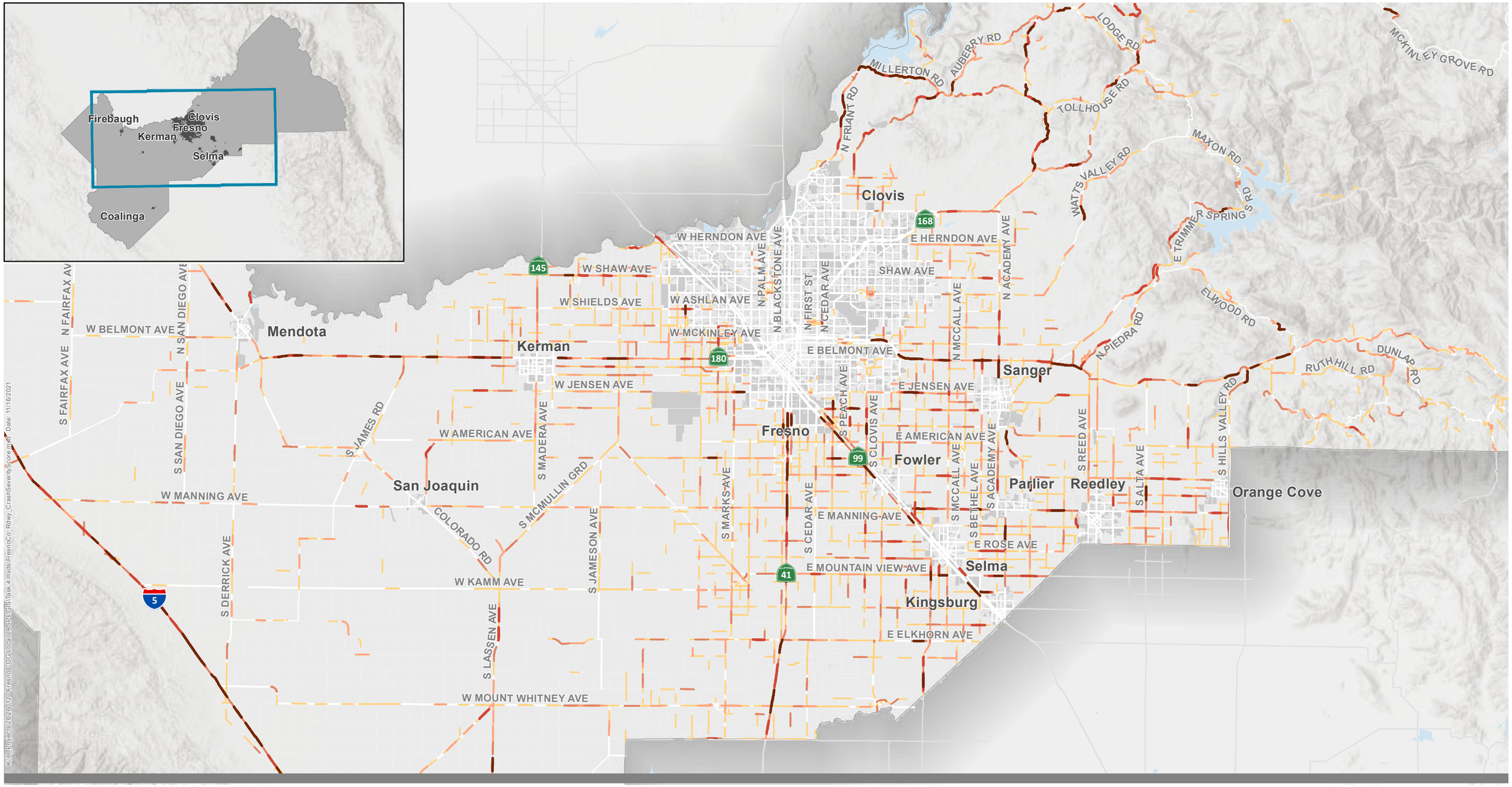
County Boundary

0 4.5 Miles

Figure 73.4

Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



Crash Severity Scores

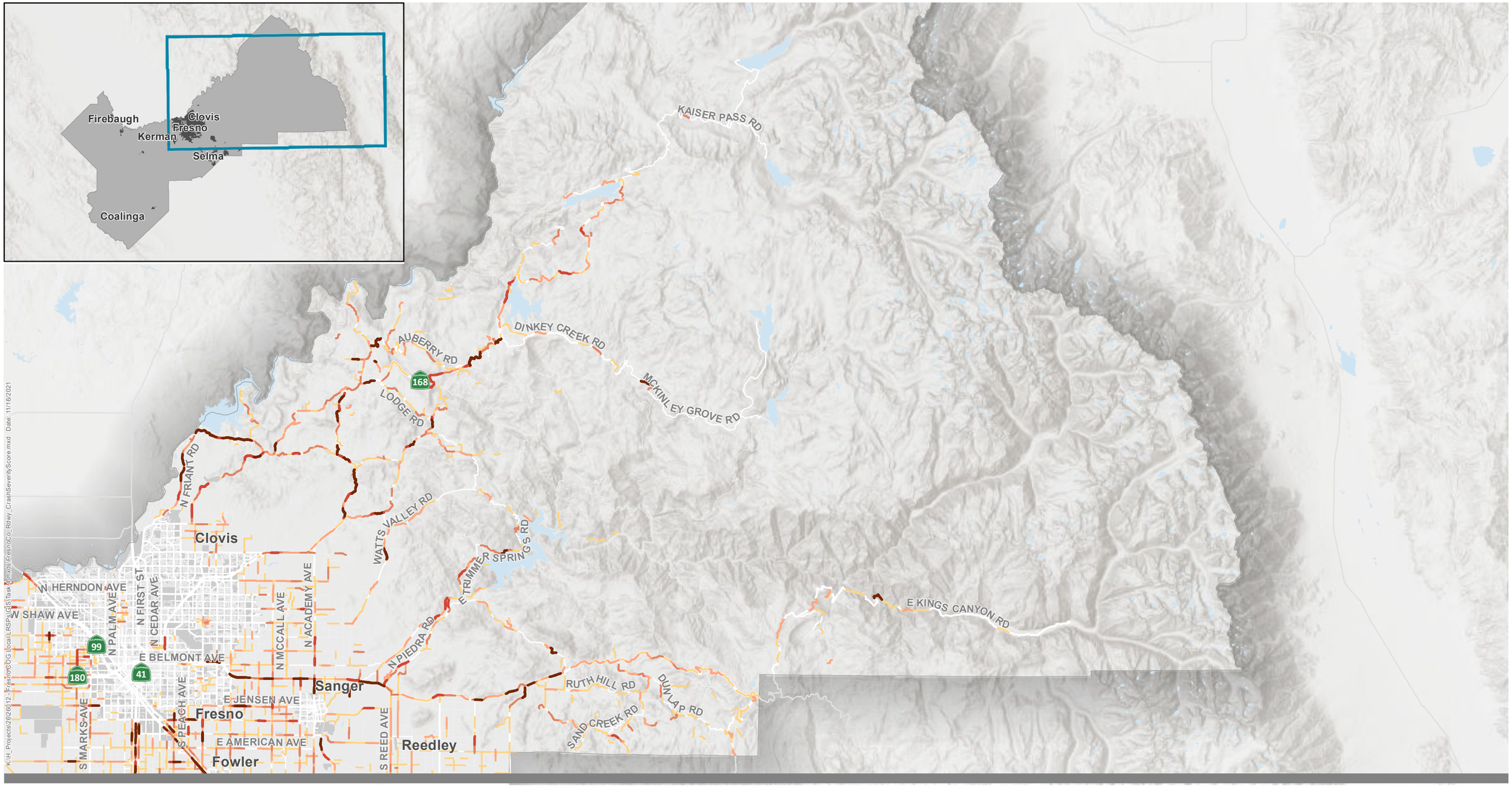
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 6 Miles

Figure 74.1

Roadway Collision Severity Scores
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



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Crash Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

KITTELSON & ASSOCIATES

Figure 74.2

Roadway Collision Severity Scores
Jurisdiction Results: Fresno County
Fresno Council of Governments

K:\H_Projects\2626012 - Fresno COG Local LRSPs\GIS\Task 4.mxds\FresnoCo_Rdwy_CrashSeverityScore.mxd Date: 11/16/2021

Crash Severity Scores

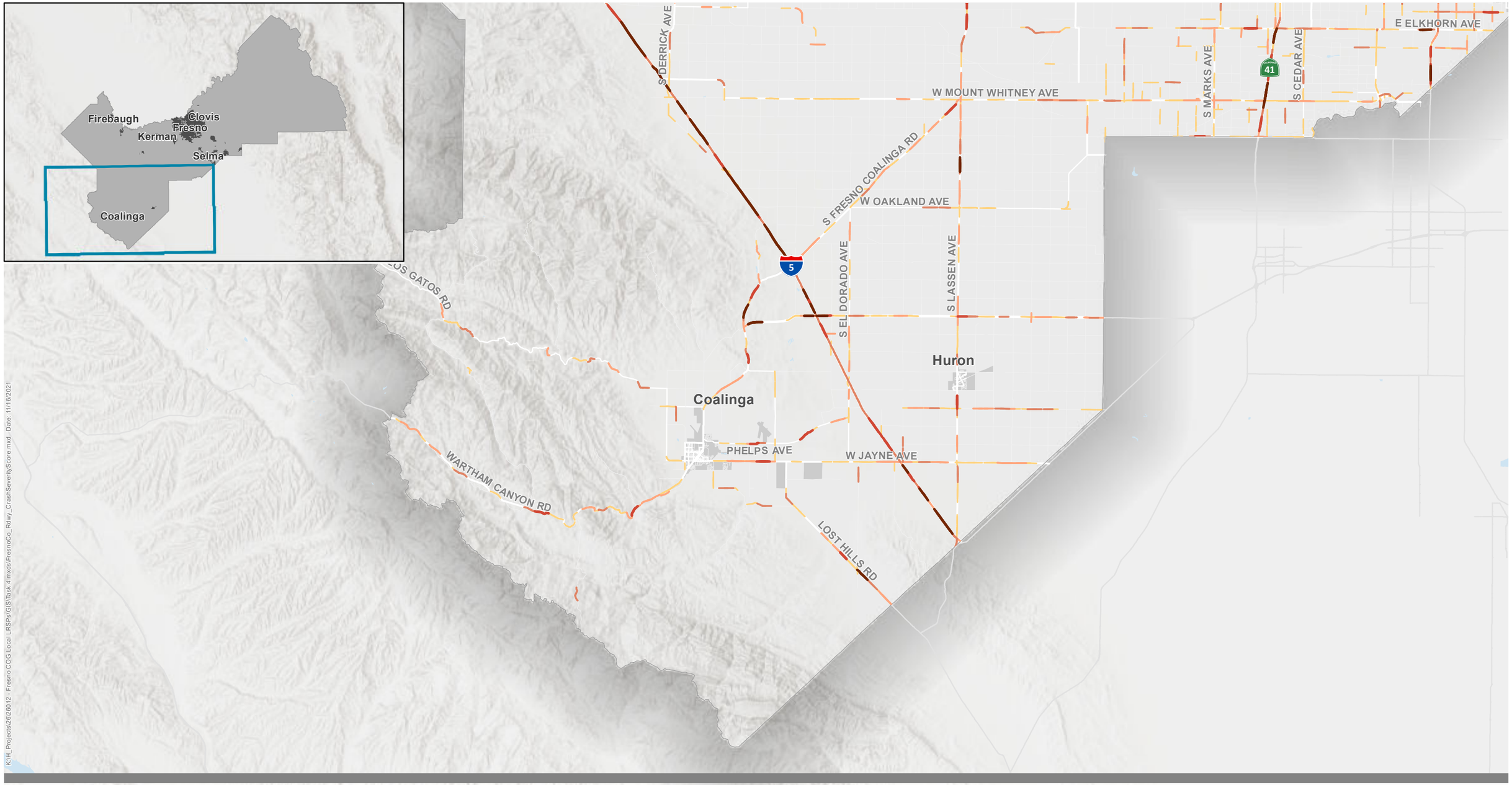
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 4.5 Miles

Figure 74.3

Roadway Collision Severity Scores Jurisdiction Results: Fresno County Fresno Council of Governments

KITTELSON & ASSOCIATES



Crash Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile

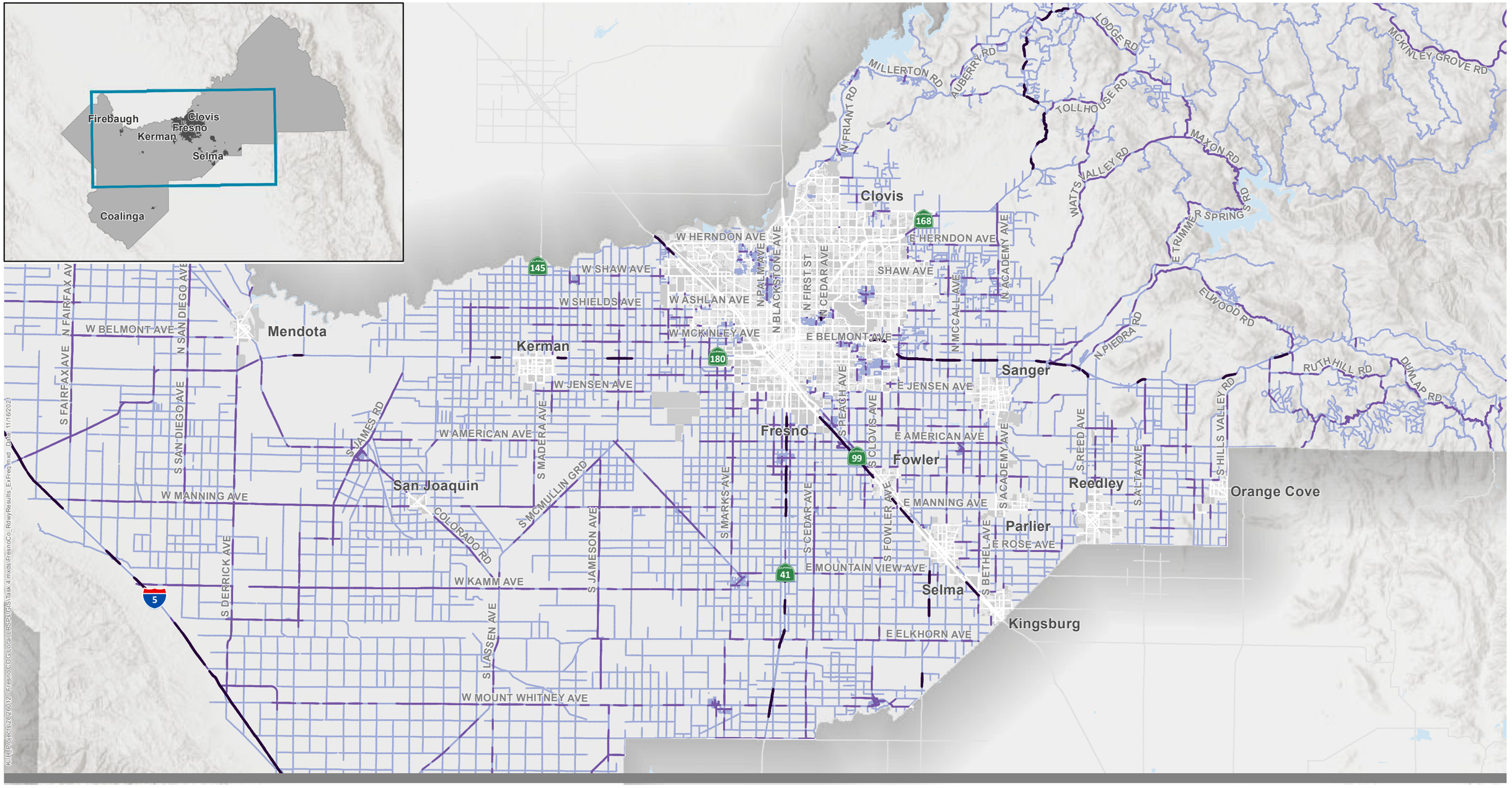
- City Limits
- County Boundary

0 4.5 Miles

Figure 74.4

Roadway Collision Severity Scores Jurisdiction Results: Fresno County Fresno Council of Governments

KITTELSON & ASSOCIATES



Excess Expected Frequency

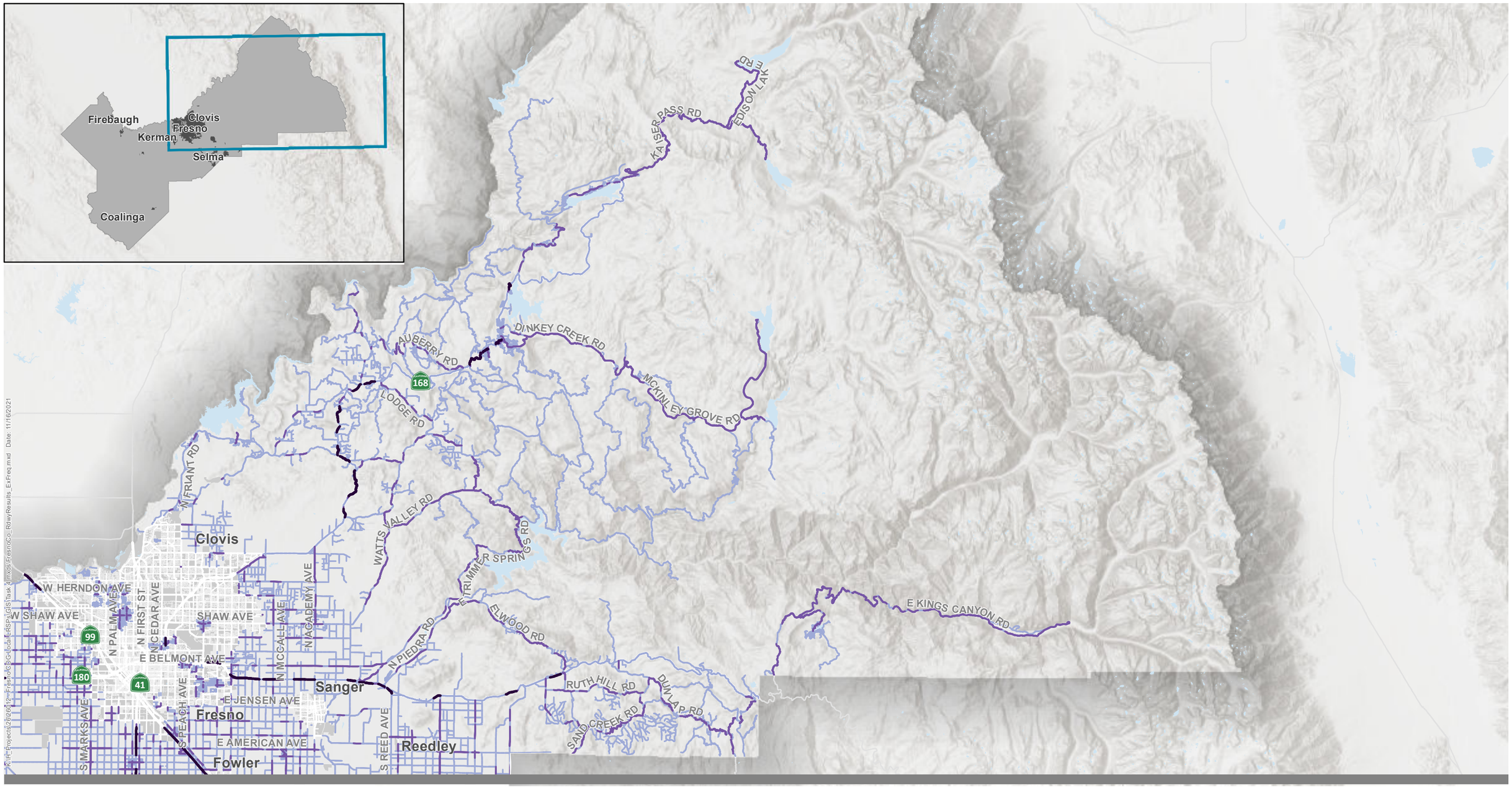
- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 6 Miles

Figure 75.1

Roadway Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



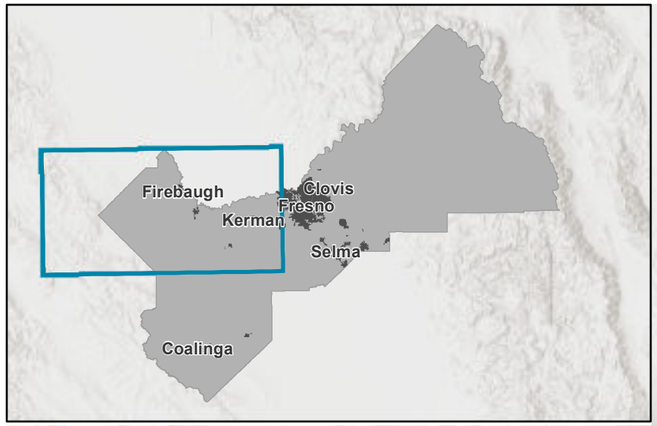
Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

Figure 75.2

Roadway Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 4.5 Miles

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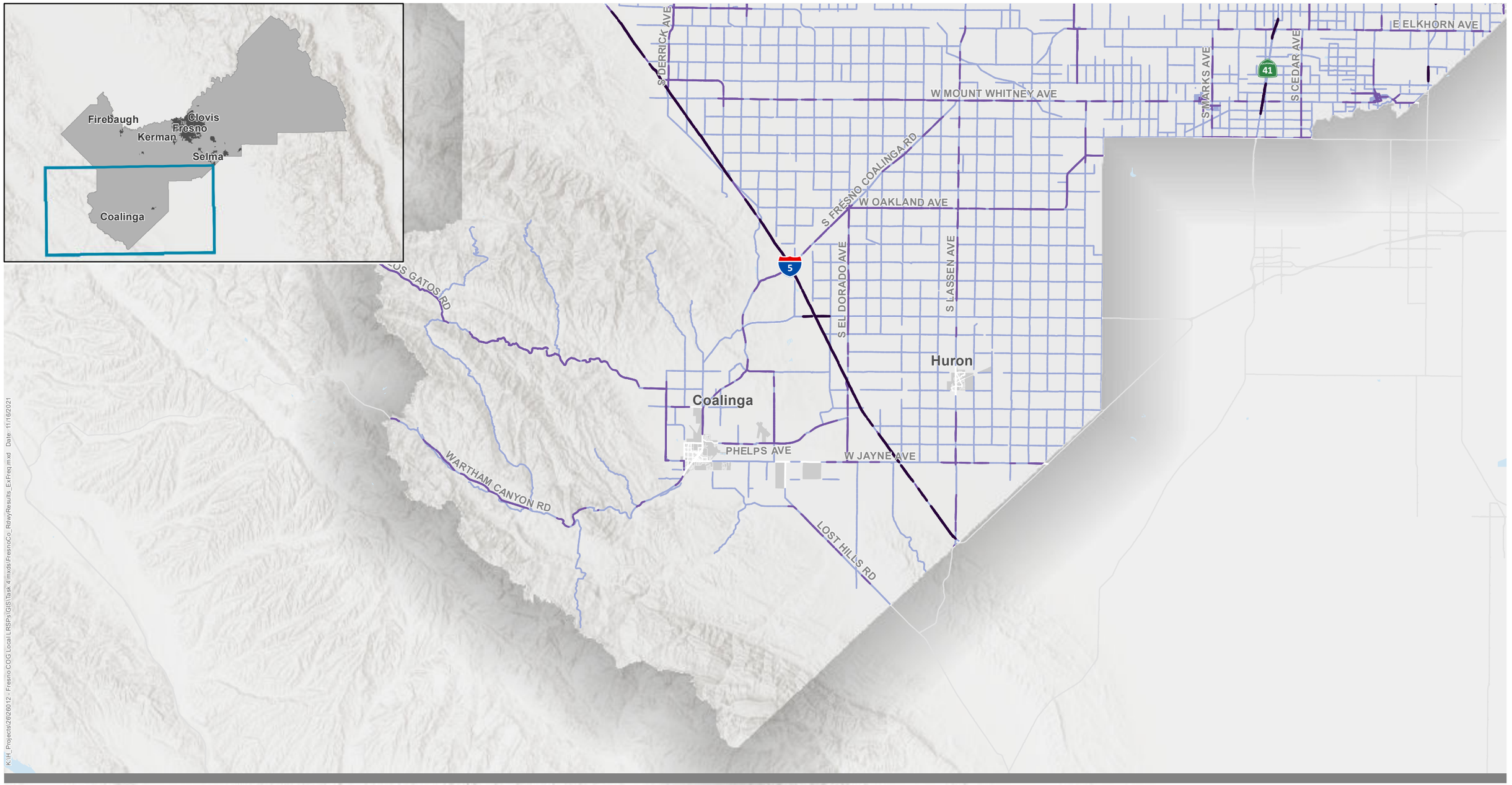
Figure 75.3

Roadway Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



Excess Expected Frequency

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 4.5 Miles

Figure 75.4

Roadway Excess Predicted Average Crash Frequency Using Method of Moments
Jurisdiction Results: Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES

Millerton Road

During development of the LRSP, there was a fatal crash at the intersection of Millerton Road and Marina Drive that renewed safety concerns related to a history of severe crashes along Millerton Road. As shown in Table 31, portions of Millerton Road were identified as having a high crash severity score using 2015-2019 data, but more recent crash data may further increase the severity score along the corridor. Data from 2020 and 2021 was obtained and showed fifteen additional reported crashes along Millerton Road between North Fork Road and Auberry Road, with five of the fifteen resulting in severe injuries. The February 2022 fatal crash has not been processed into the SWITRS system but was documented in news coverage. These more recent fatal and severe crashes would further heighten the crash severity score from what is shown in the data findings of this report and indicate the crash history along Millerton Road would rank it as a high priority location.

EMPHASIS AREAS

Based on key trends in the crash data, emphasis areas for unincorporated Fresno County include pedestrian and bicycle crashes, broadside crashes, hit object crashes and overturned crashes. Due to the prevalence of collision factors citing driving under the influence and unsafe speed, strategies aimed at encouraging safe driver behaviors is included as an emphasis area. Each of these areas is further discussed below.

Pedestrian and Bicycle Crashes

Pedestrian and bicycle crashes were identified as a focus area given the overrepresentation of pedestrians and bicyclists in fatal and severe crashes. Of the 357 fatal crashes, 35 involved a pedestrian and 14 a bicyclist. Of the 892 severe injury crashes, 39 involved a pedestrian and 23 a bicyclist.

Pedestrians and bicyclists are identified as two of the six high priority challenge areas in the California SHSP. These challenge areas "were identified through historical data evaluations and feedback from traffic safety stakeholders across the state" (Caltrans SHSP). The high priorities represent "the greatest opportunity to reduce fatalities and serious injuries across the state" (Caltrans SHSP).

Broadside Crashes

A broadside crash occurs when the front of one vehicle hits the side of another vehicle. Broadside crashes were selected as an emphasis area due to the frequency and severity of these collision types. Broadside crashes were the second most frequent collision type and represent 30 percent of fatal and severe injury crashes. Of the 357 fatal crashes, 105 were broadside crashes. As discussed below under Engineering Strategies, countermeasures are available targeted at broadside crashes.

Hit Object Crashes

Hit object crashes were selected as an emphasis area due to their frequency and severity. They are the most common collision type and represent 25 percent of fatal and severe injury crashes. A variety of roadway countermeasures are available targeted at reducing hit object crashes.

One particular concern for hit object crashes on County roadways related to narrow bridges with headwalls that act as fixed objects with little to no clearance on the overpassing roadway. The existing conditions at several locations across the County include headwalls located close to the paved area on high-speed two-lane roadways and do not provide any clear recovery zones. These headwalls are also unexpected for drivers as most of the adjacent roadway stretches are clear with farm lands or other natural areas. These fixed object hazards likely are common contributors to the hit object crash trend observed in the data.

The California SHSP includes lane departures as one of the six high priorities in California. As indicated in the Caltrans SHSP, "the Lane Departures Challenge Area includes head-on, hit object, and overturned crashes. This includes instances where a vehicle runs off the road or crosses into the opposing lane prior to the collision." These crashes are a high priority due to their severity level.

Overturned Crash

Overturned crashes were selected as an emphasis area due to their severity. Overturned crashes account for 14 percent of fatal/severe crashes, including 46 of the 357 fatal crashes. Unsafe speed, poor weather, and darkness are often common factors for overturned vehicle crashes and countermeasures are available to address those as discussed below under Engineering Strategies.

As indicated under hit object crashes discussion, the California SHSP includes lane departures – which includes overturned crashes – as one of the six high priorities in California.

Driver Behavior

Driving or bicycling under the influence of alcohol and drugs is the second most common primary collision factor in fatal/severe crashes. Unsafe speed is the most frequently reported PCF among all reported crashes and the third most frequent in fatal/severe injury crashes. This suggests there are opportunities to address driver behavior through countermeasures that encourage lower speeds and education and enforcement.

The California SHSP also identified impaired driving and speed management/aggressive driving as two of the six high priorities in California, reflecting the potential to reduce fatalities and serious injuries by addressing these challenge areas.

STRATEGIES

The following subsections present engineering, education, emergency services, and enforcement strategies to help improve roadway safety across the County.

Engineering Strategies

The top three fatal and severe injury collision types in Fresno County were **broadside**, **hit object**, and **overturned** crashes; the top three fatal and severe injury primary collision factors were **improper turning**, **driving under the influence**, and **unsafe speed**. High priority countermeasures to address these collision types and primary collision factors are shown in Table 32.

Appendix B contains the regional Countermeasures Toolbox which includes more detailed information regarding the countermeasures listed above.

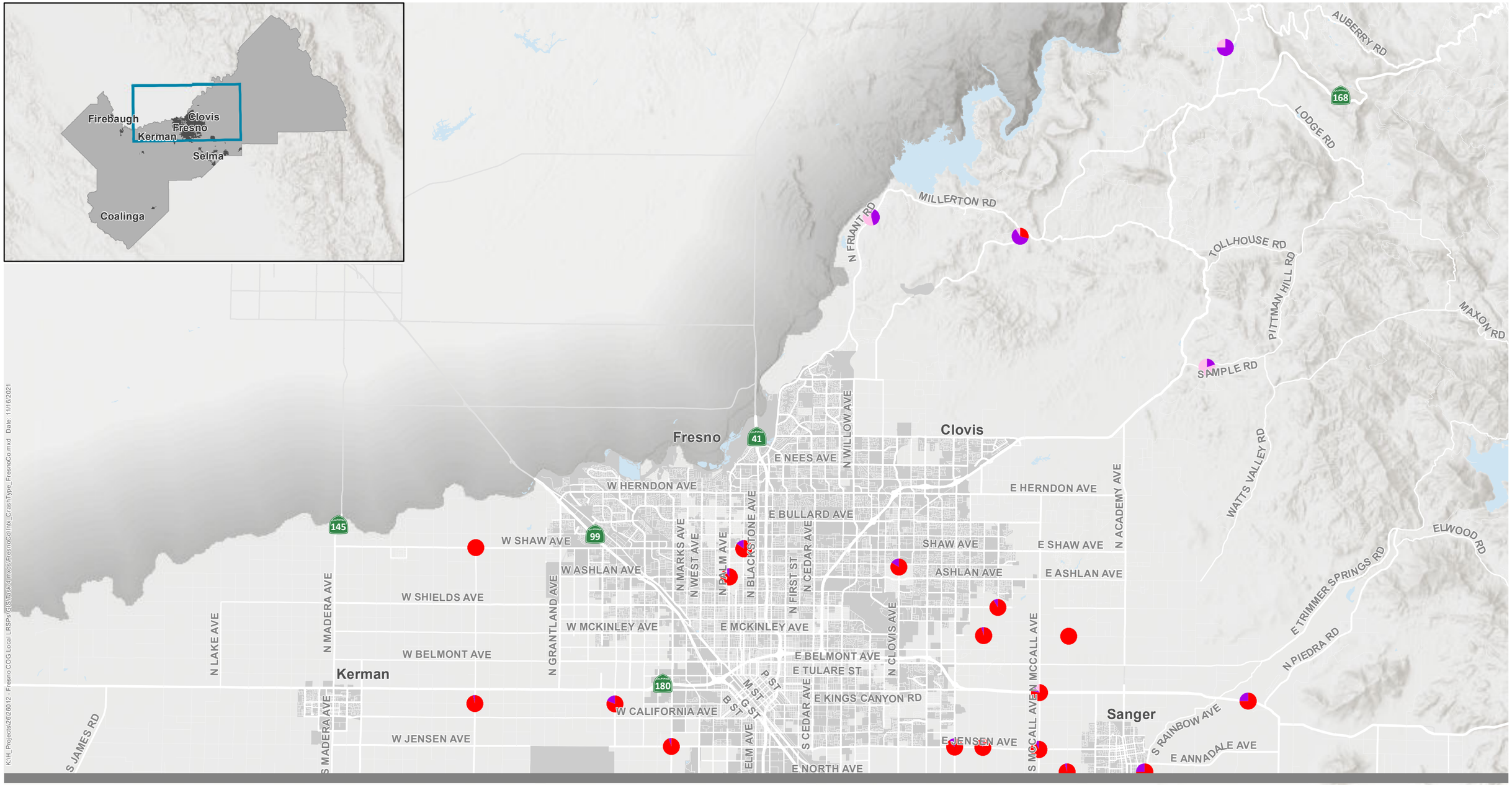
The following figures and tables provide data on collision types and factors for the intersections and roadways with the highest crash scores. The locations with the highest crash scores may be top priorities for implementing countermeasures and pursuing grants. Fresno County can use the information about collision type and factors to identify potential countermeasures to apply, using the information in Table 32.

Figure 76.1 to Figure 76.3 and Figure 77.1 to Figure 77.3 present the top priority intersections and breakdown of the top collision types and primary collision factors, respectively. Figure 78 and Figure 79 present the top priority roadways and breakdown of the top collision types and primary collision factors, respectively.

Table 32. High Priority Countermeasures

	Countermeasure Name	ID	Crashes Addressed
Roadway Countermeasures	Street Lighting	R1	Crashes at night
	Remove or Relocate Fixed Objects Outside of Clear Recovery Zone	R2	Hit object, unsafe speed
	Install Guardrails	R4	Hit object, unsafe speed
	Install Raised Median	R8	Improper turning
	Road Diet	R14	Hit object, unsafe speed
	Widen Shoulder	R15	Hit object, unsafe speed
	Improve Pavement Friction (High Friction Surface Treatment)	R21	Hit object, unsafe speed
	Install/Upgrade Signs with New Fluorescent Sheeting	R22	Hit object, unsafe speed
	Install Dynamic/Variable Speed Warning Signs	R26	Hit object, unsafe speed
	Install Edgelines and Centerlines	R28	Hit object, unsafe speed
	Install Edgeline Rumble Strips/Stripes	R31	Hit object, unsafe speed
	Install Variable Message Signs		Crashes in poor weather conditions
Intersection Countermeasures	Add Intersection Lighting at Intersections	S1/NS1	Crashes at night
	Improve Signal Hardware: Lenses, Backplates with Retroreflective Border, Mounting Size, Number	S2	Broadside
	Provide Advanced Dilemma-Zone Detection	S4	All
	Install Flashing Beacons as Advance Warning	S10/NS9	Broadside, unsafe speed
	Convert Intersection to Roundabout	NS4/NS5	Unsafe speed
	Install/Upgrade Stop Signs or Intersection Warning/ Regulatory Signs	NS6	Broadside
	Upgrade Intersection Pavement Markings	NS7	Broadside
	Install Splitter Islands for Minor Street Approaches	NS13	Broadside
Pedestrian/Bicycle Countermeasures	Install Bike Lanes	R32PB	Overrepresented bicycle crashes
	Install Sidewalk/Pathway	R34PB	Pedestrian crashes
	Install/Upgrade Pedestrian Crossing with Enhanced Features	R35PB	Pedestrian crashes
	Install Pedestrian Countdown Signal Heads	S17PB	Pedestrian crashes
	Install Pedestrian Crossing	S18PB/NS20PB	Pedestrian crashes
	Modify Signal Phasing to Implement a Leading Pedestrian Interval	S21PB	Pedestrian crashes
	Install Raised Medians (or Refuge Islands)	NS19PB	Pedestrian crashes
	Install/Upgrade Pedestrian Crossing at Uncontrolled Locations (with Enhanced Safety Features)	NS21PB	Pedestrian crashes
	Bike Lane Extension Through Intersections	n/a	Overrepresented bicycle crashes
	Bike Boxes	n/a	Overrepresented bicycle crashes

Notes: The ID number references the Caltrans Manual Local Road Safety
There were no high priority intersection countermeasures listed for Fresno County. Intersection countermeasures listed were given a medium priority.



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Collision Type

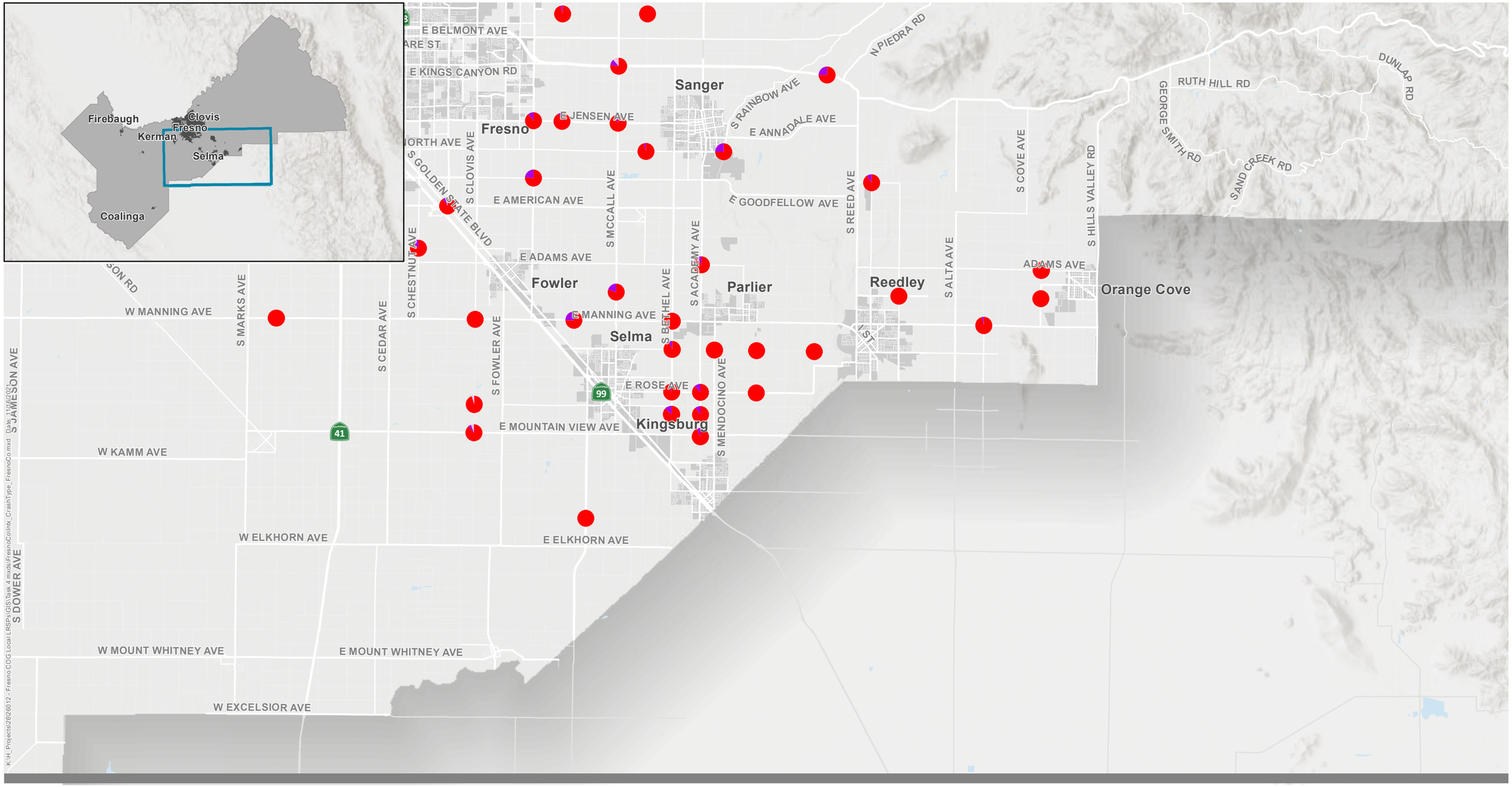
- Broadside
- Hit Object
- Overturned

- City Limits
- County Boundary

KITTELSON & ASSOCIATES

Figure 76.1

Top Fatal/Severe Injury Intersection Collision Types
Jurisdiction Results: Unincorporated Fresno County
Fresno Council of Governments



Collision Type

- Broadside
- Hit Object
- Overturned

City Limits

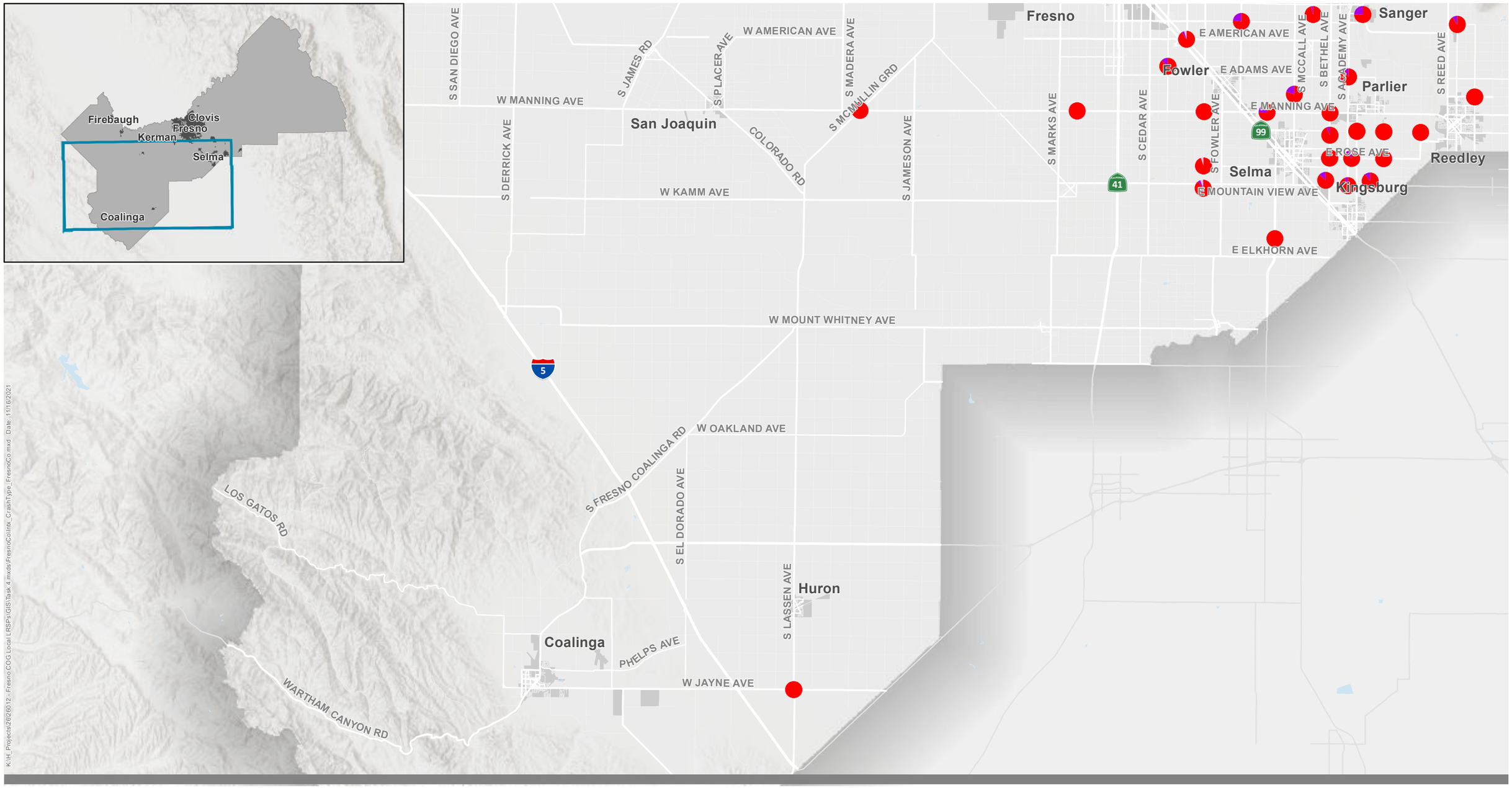
County Boundary

0 3 Miles

KITTELSON & ASSOCIATES

Figure 76.2

Top Fatal/Severe Injury Intersection Collision Types
Jurisdiction Results: Unincorporated Fresno County
Fresno Council of Governments



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Collision Type

- Broadside
- Hit Object
- Overturned

City Limits

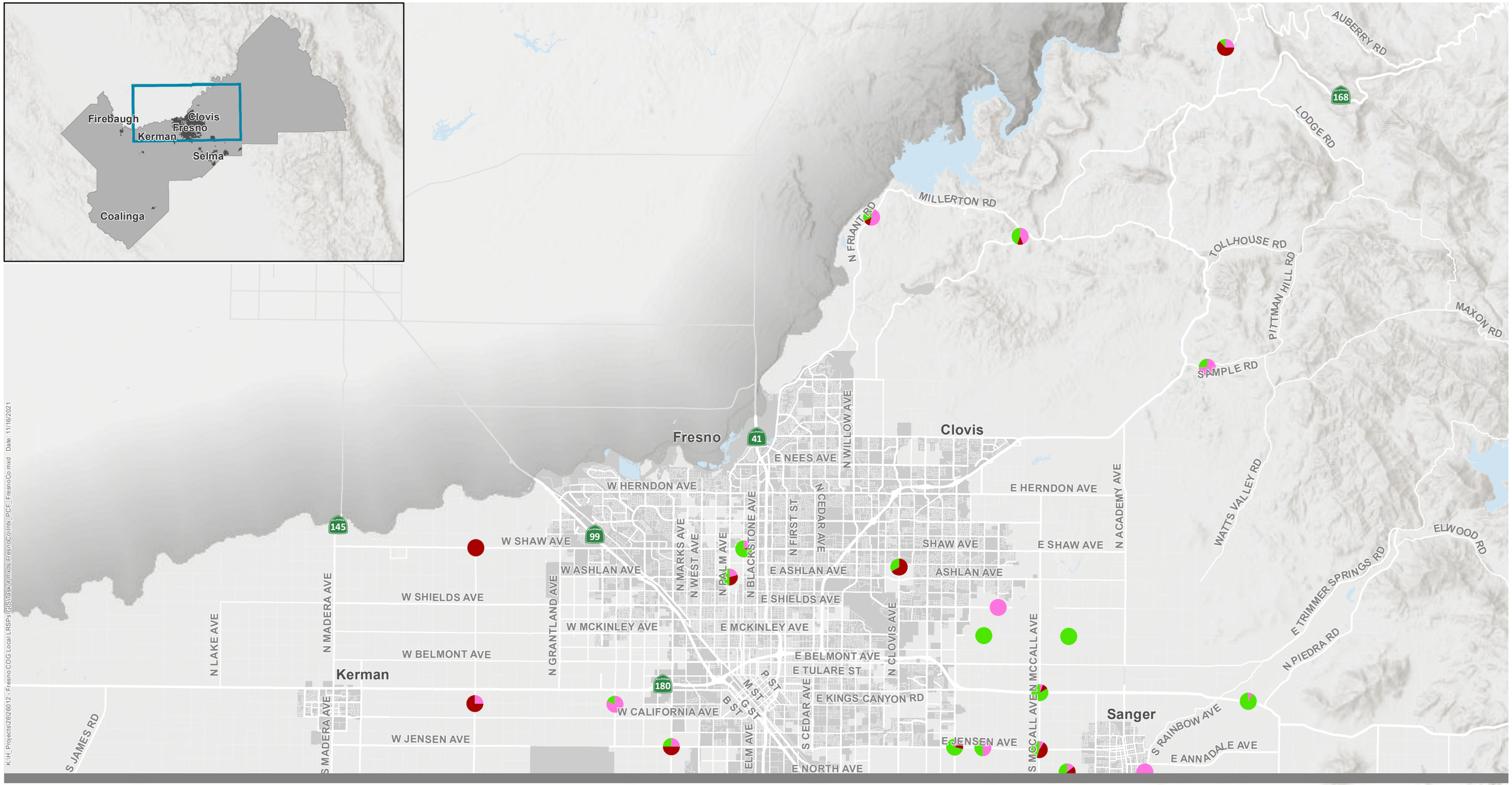
County Boundary

0 4.5 Miles

KITTELSON & ASSOCIATES

Figure 76.3

Top Fatal/Severe Injury Intersection Collision Types
Jurisdiction Results: Unincorporated Fresno County
Fresno Council of Governments



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Primary Collision Factors

- Improper Turning
- Driving Under the Influence
- Unsafe Speed

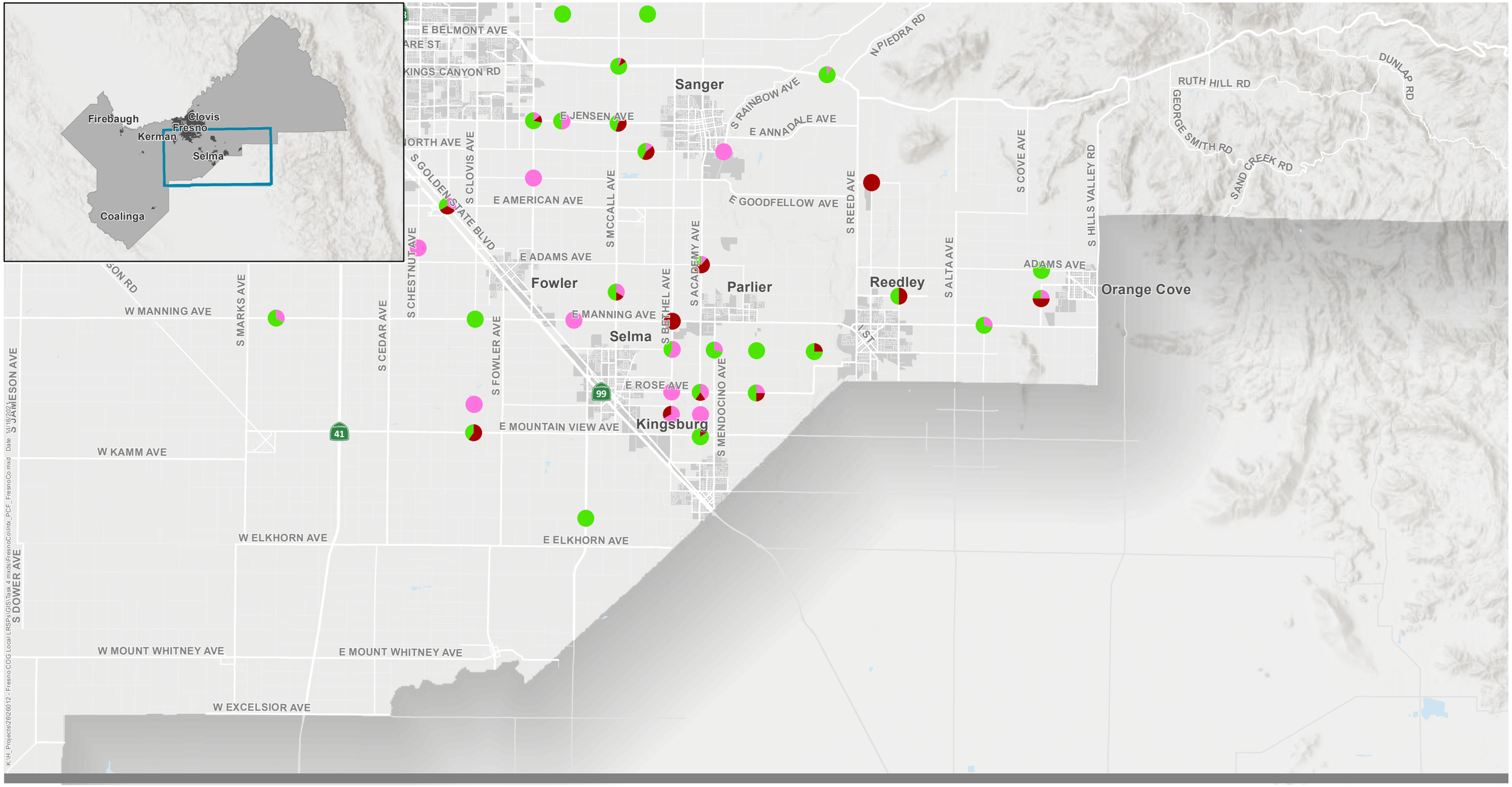
- City Limits
- County Boundary

0 3 Miles

Figure 77.1

Top Fatal/Severe Injury Intersection Primary Collision Factors
Jurisdiction Results: Unincorporated Fresno County
Fresno Council of Governments

KITTELSON & ASSOCIATES



Primary Collision Factors

- Improper Turning
- Driving Under the Influence
- Unsafe Speed

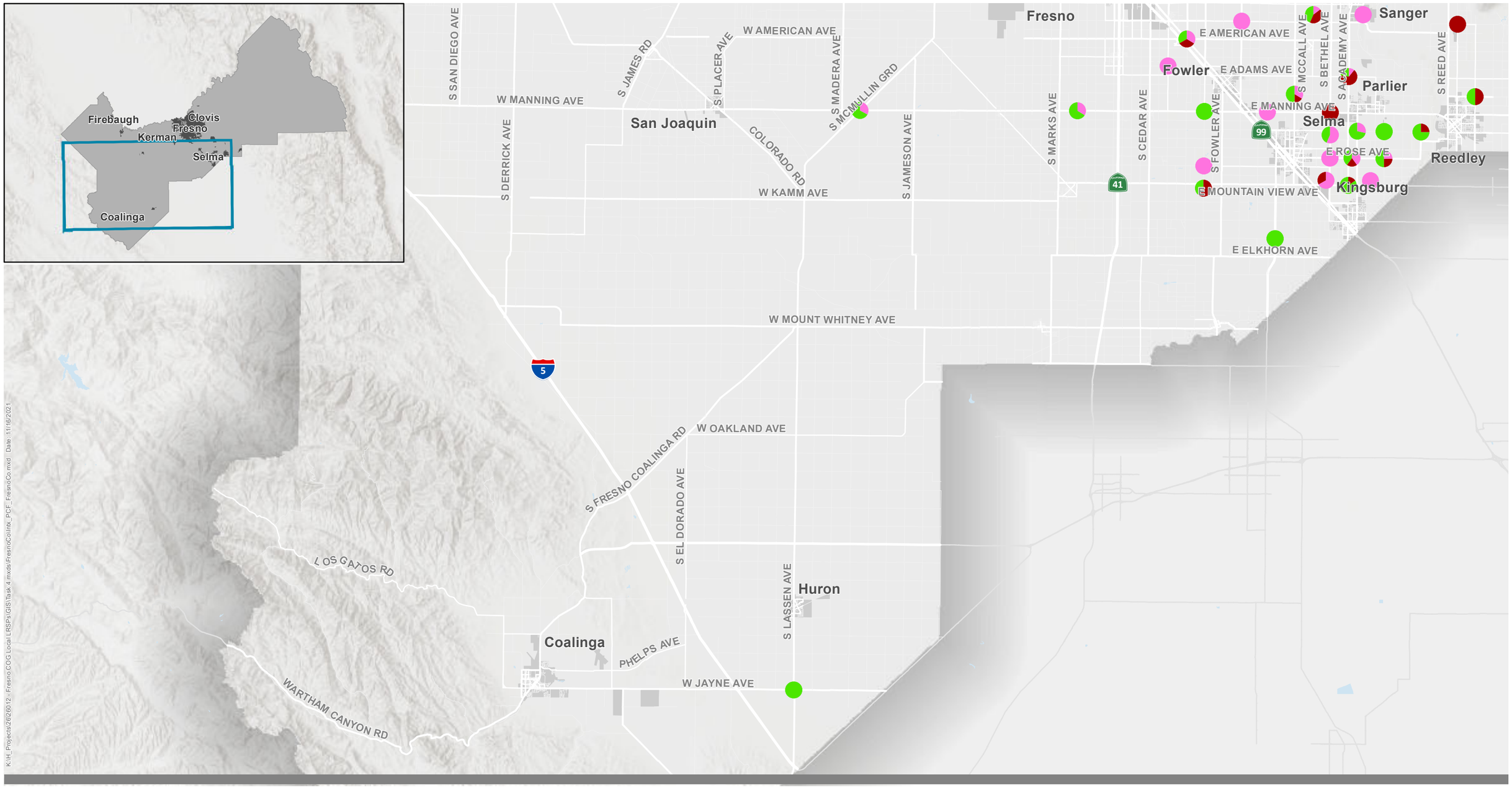
- City Limits
- County Boundary

0 3 Miles

Figure 77.2

Top Fatal/Severe Injury Intersection Primary Collision Factors Jurisdiction Results: Unincorporated Fresno County Fresno Council of Governments

KITTELSON & ASSOCIATES



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Primary Collision Factors

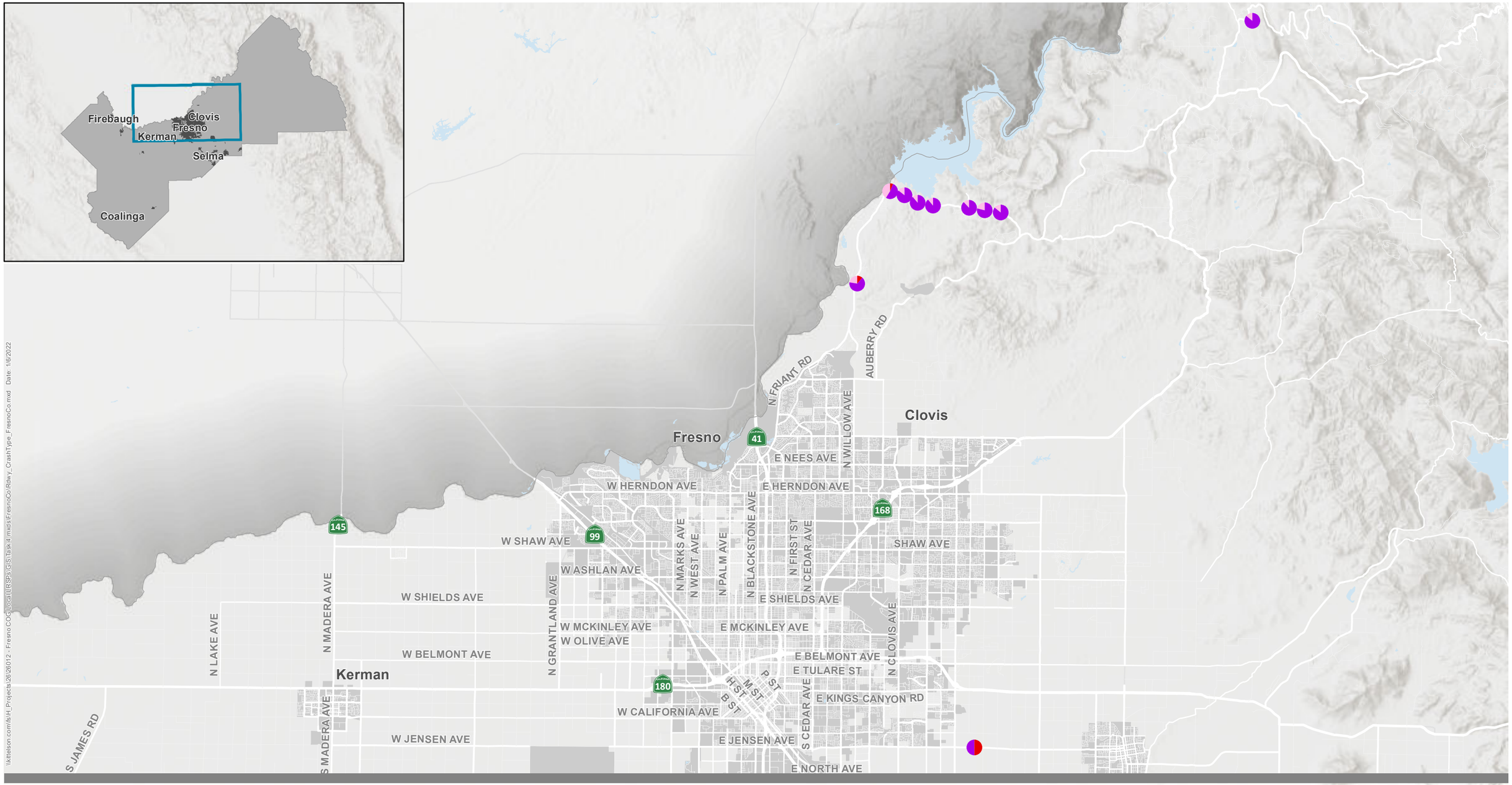
- Improper Turning
- Driving Under the Influence
- Unsafe Speed

- City Limits
- County Boundary

Figure 77.3

Top Fatal/Severe Injury Intersection Primary Collision Factors Jurisdiction Results: Unincorporated Fresno County Fresno Council of Governments

KITTELSON & ASSOCIATES



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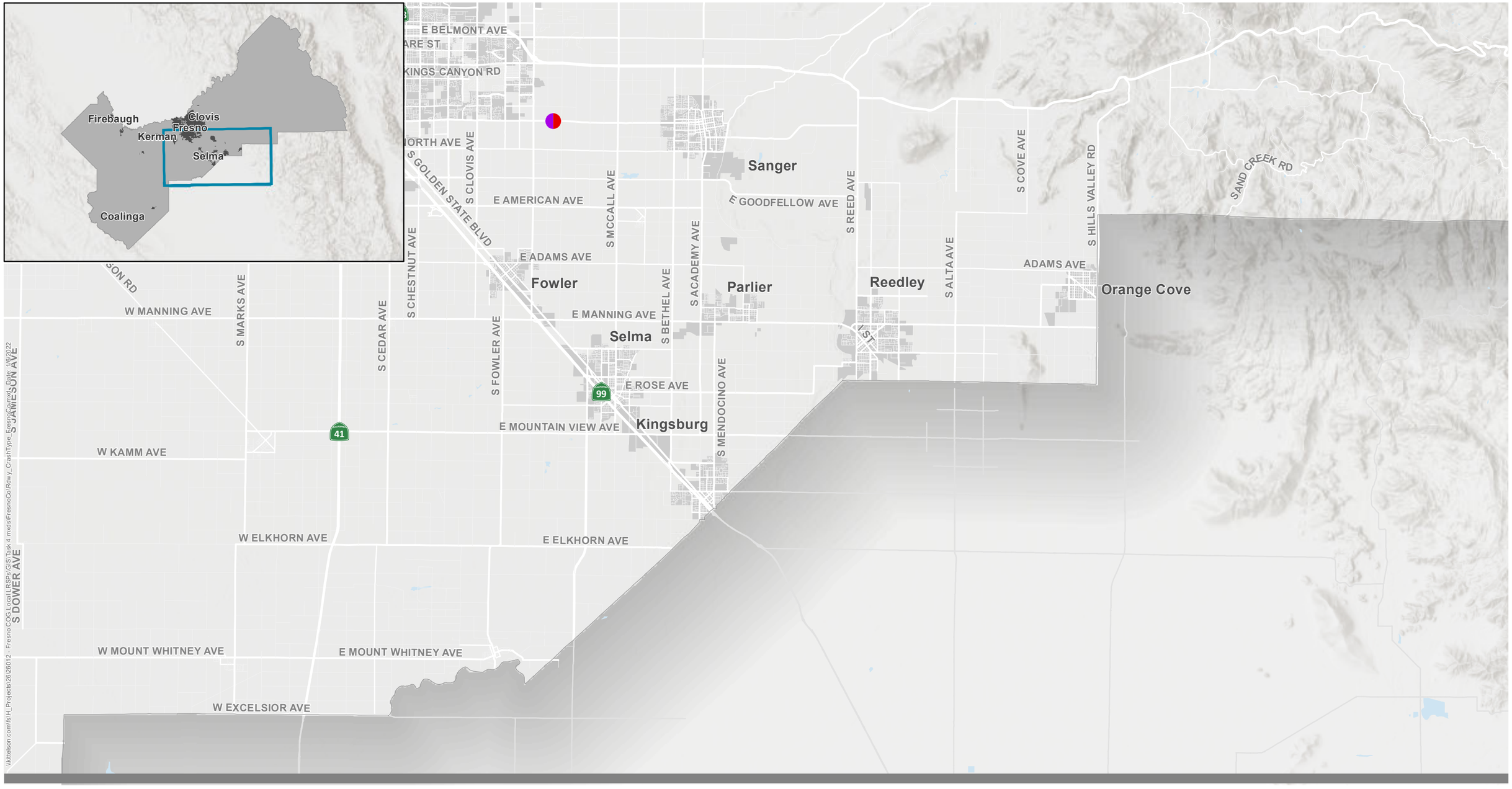
Collision Type

- Broadside
- Hit Object
- Overturned
- Priority Roadways
- City Limits
- County Boundary

KITTELSON & ASSOCIATES

Figure 78.1

Intersection Top 3 Collision Types
Jurisdiction Results: Unincorporated Fresno County
Fresno Council of Governments



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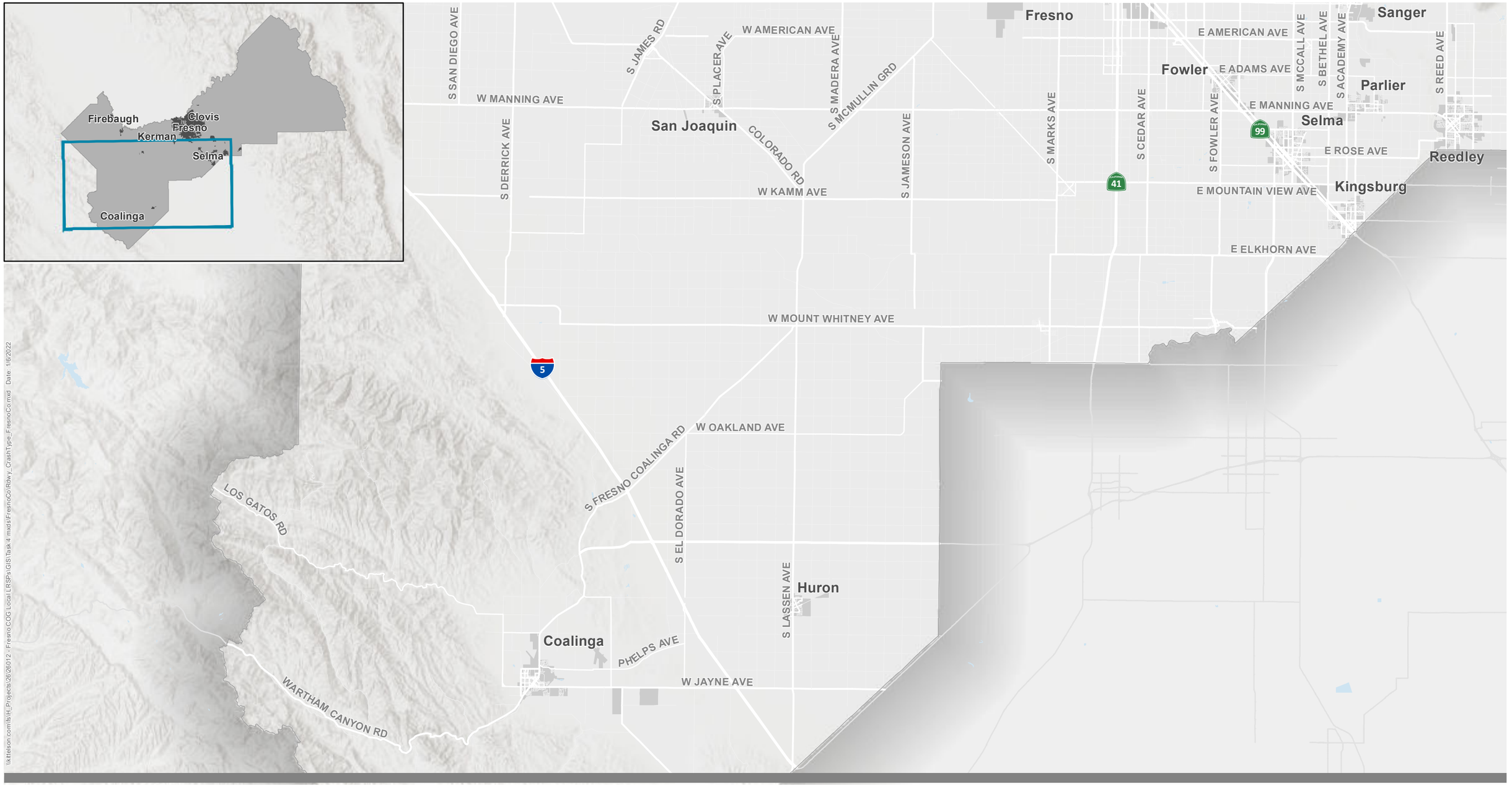
Collision Type

- Broadside
- Hit Object
- Overturned
- Priority Roadways
- City Limits
- County Boundary

KITTELSON & ASSOCIATES

Figure 78.2

Intersection Top 3 Collision Types
Jurisdiction Results: Unincorporated Fresno County
Fresno Council of Governments



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Collision Type

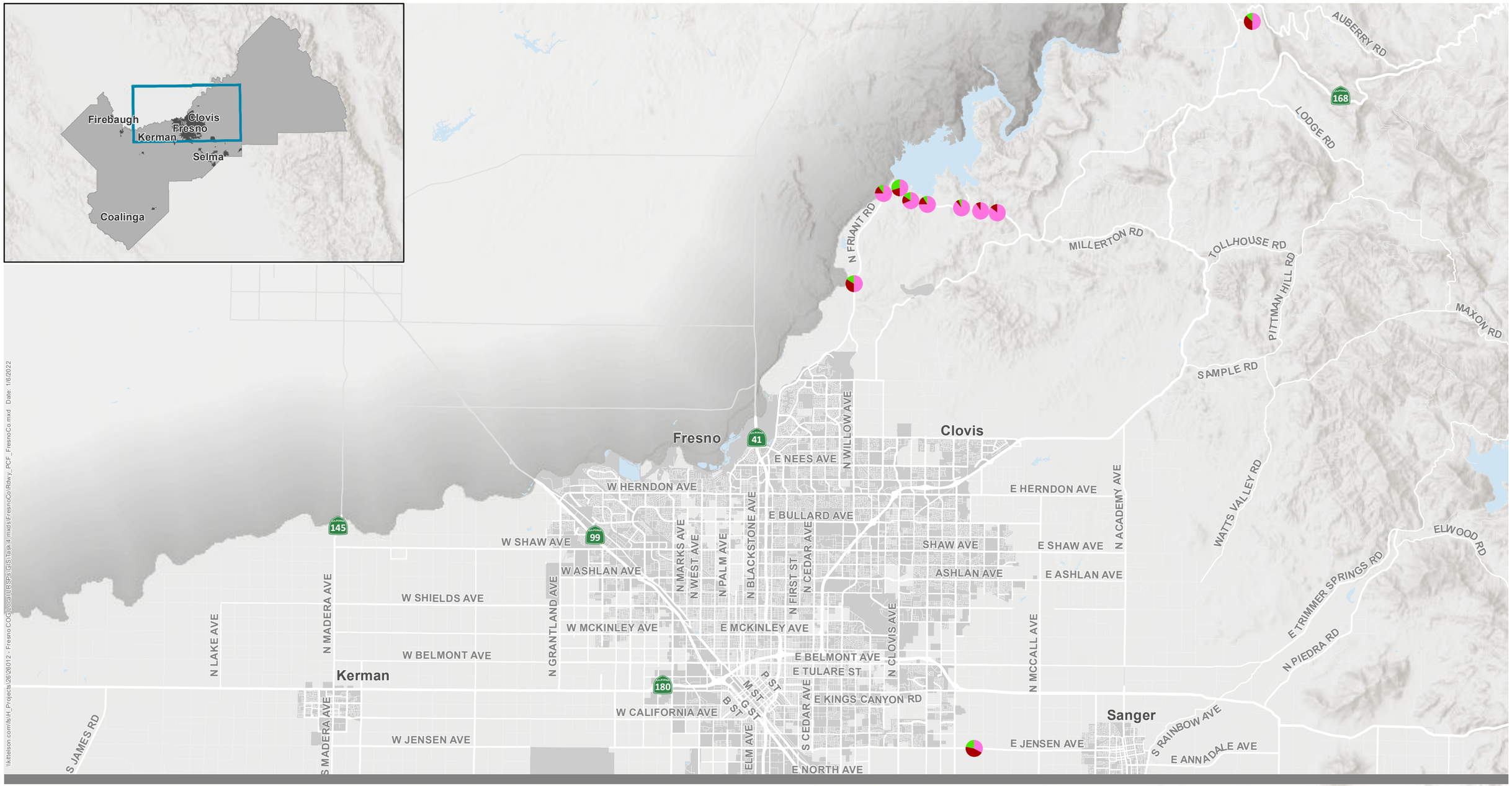
- Broadside
- Hit Object
- Overturned
- Priority Roadways
- City Limits
- County Boundary

0 4.5 Miles

KITTELSON & ASSOCIATES

Figure 78.3

Intersection Top 3 Collision Types
Jurisdiction Results: Unincorporated Fresno County
Fresno Council of Governments



Primary Collision Factors

- Improper Turning
- Driving Under the Influence
- Unsafe Speed
- Priority Roadways

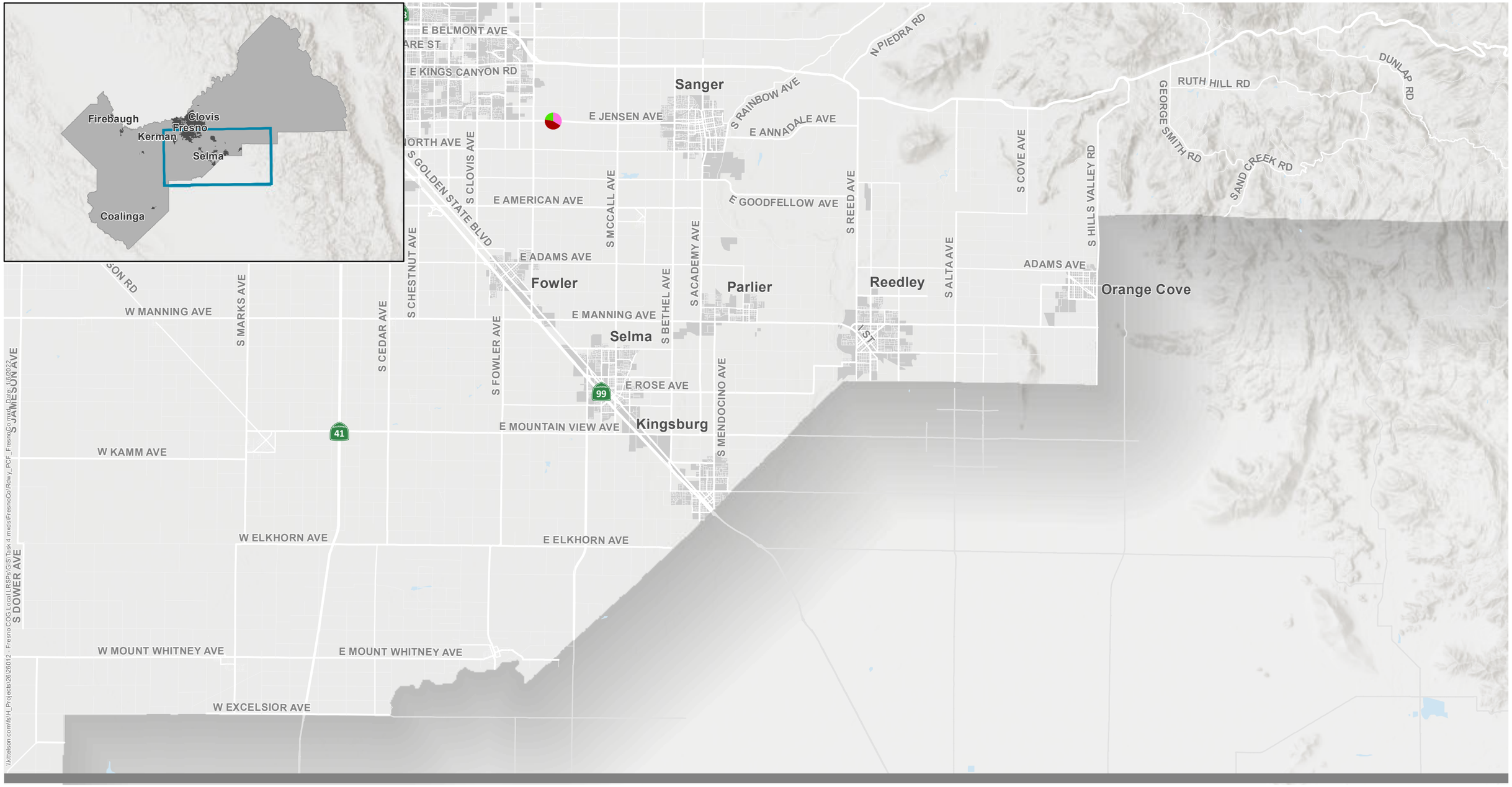
- City Limits
- County Boundary

0 3 Miles

KITTELSON & ASSOCIATES

Figure 79.1

Top Fatal/Severe Injury Roadway Primary Collision Factor Jurisdiction Results: Unincorporated Fresno County Fresno Council of Governments



Primary Collision Factors

- Improper Turning
- Driving Under the Influence
- Unsafe Speed
- Priority Roadways
- City Limits
- County Boundary

0 3 Miles

Figure 79.2

Top Fatal/Severe Injury Roadway Primary Collision Factor Jurisdiction Results: Unincorporated Fresno County Fresno Council of Governments

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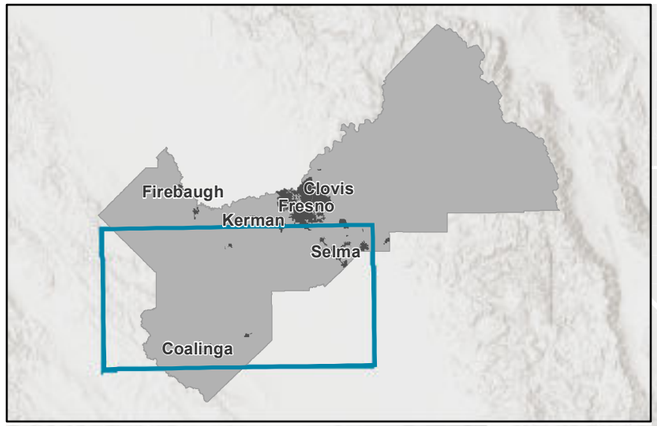

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Primary Collision Factors

- Improper Turning
- Driving Under the Influence
- Unsafe Speed
- Priority Roadways

- City Limits
- County Boundary

0 4.5 Miles

KITTELSON & ASSOCIATES

Figure 79.3

Top Fatal/Severe Injury Roadway Primary Collision Factor Jurisdiction Results: Unincorporated Fresno County Fresno Council of Governments

Table 33 and Table 34 provide information for the top fifty intersection locations (based on crash severity score), including control type (signalized or unsignalized), crash severity score, and total number of crashes by collision type or primary collision factor.

Table 33. Priority Intersections with Collision Type based on Top 3 Fatal/Severe Injury Collision Types

#	Location	Type	Crash Severity Score	Total Number of Crashes	Collision Type			
					Broadside	Hit Object	Over-turned	Other
1	LAC JAC AVE & DINUBA AVE	Unsignalized	201.09	15	12	0	0	3
2	FRANKWOOD AVE & CENTRAL AVE	Unsignalized	164.99	14	10	1	0	3
3	ACADEMY AVE & ADAMS AVE	Unsignalized	162.93	18	11	1	0	6
4	BETHEL AVE & DINUBA AVE	Unsignalized	157.25	49	44	3	0	2
5	AUBERRY RD & FRAZIER RD	Unsignalized	154.92	8	0	6	2	0
6	KEARNEY BLVD & CORNELIA AVE & MADISON AVE	Unsignalized	139.01	29	22	5	0	2
7	CLOVIS AVE & MOUNTAIN VIEW AVE	Unsignalized	137.94	19	16	1	1	1
8	BETHEL AVE & ROSE AVE	Unsignalized	135.54	25	20	1	0	4
9	CLOVIS AVE & NEBRASKA AVE	Unsignalized	133.24	20	19	0	1	0
10	MARKS AVE & JENSEN AVE	Unsignalized	132.02	19	17	1	0	1
11	AMERICAN AVE & GOLDEN STATE BLVD	Unsignalized	128.81	26	20	1	1	4
12	FRIANT RD & BELCHER	Unsignalized	128.36	15	0	6	7	2
13	BETHEL AVE & NEBRASKA AVE	Unsignalized	127.34	15	13	2	0	0
14	MCMULLIN GRD & MANNING AVE	Unsignalized	127.13	19	19	0	0	0
15	FRONTIER TRAIL LN & SAMPLE RD	Unsignalized	122.99	8	0	1	4	3
16	TEMPERANCE AVE & CENTRAL AVE	Unsignalized	121.12	13	10	3	0	0
17	TEMPERANCE AVE & JENSEN AVE	Signal	120.58	34	26	3	0	5
18	HILL AVE & SOUTH AVE	Unsignalized	118.78	11	8	0	0	3
19	PALM AVE & ASHLAN AVE	Signal	116.62	63	31	3	0	29
20	MCCALL AVE & KINGS CANYON RD	Signal	113.07	26	7	1	1	17
21	ACADEMY AVE & NEBRASKA AVE	Unsignalized	107.37	30	26	3	0	1
22	BETHEL AVE	Signal	105.38	13	13	0	0	0
23	DICKENSON AVE & KEARNEY BLVD	Unsignalized	103.69	31	28	1	0	2
24	CRAWFORD AVE & MANNING AVE	Unsignalized	102.08	28	21	1	0	6
25	DE WOLF AVE & MCKINLEY AVE	Unsignalized	98.92	27	21	1	0	5
26	ZEDIKER AVE & ROSE AVE	Unsignalized	96.98	27	26	0	0	1
27	ACADEMY AVE & MOUNTAIN VIEW AVE	Signal	96.36	31	14	1	0	16
28	AUBERRY RD & MILLERTON RD	Unsignalized	95.87	27	7	15	2	3
29	DEL REY AVE & NORTH AVE	Unsignalized	95.86	26	21	1	0	4
30	MENDOCINO AVE & DINUBA AVE	Unsignalized	92.32	18	13	0	0	5

#	Location	Type	Crash Severity Score	Total Number of Crashes	Collision Type			
					Broadside	Hit Object	Over-turned	Other
31	KINGS CANYON RD & RIO VISTA AVE	Unsignalized	91.21	18	3	1	0	14
32	MCCALL AVE & SOUTH AVE	Unsignalized	87.88	12	8	2	0	2
33	DE WOLF AVE & JENSEN AVE	Unsignalized	87.85	16	14	1	0	1
34	BUTTONWILLOW AVE & SOUTH AVE	Unsignalized	87.65	15	12	0	0	3
35	DEL REY AVE & MCKINLEY AVE	Unsignalized	87.58	10	8	0	0	2
36	ACADEMY AVE & ROSE AVE	Unsignalized	86.42	19	15	2	0	2
37	DICKENSON AVE & SHAW AVE	Unsignalized	86.14	13	9	0	0	4
38	CHESTNUT AVE & CLAYTON AVE	Unsignalized	85.14	8	7	1	0	0
39	MCCALL AVE & JENSEN AVE	Signal	84.20	21	12	1	0	8
40	ZEDIKER AVE & DINUBA AVE	Unsignalized	84.19	12	10	0	0	2
41	LEONARD AVE & SHIELDS AVE	Unsignalized	83.90	11	10	1	0	0
42	CLOVIS AVE & DONNER AVE	Unsignalized	83.31	9	5	1	0	3
43	LASSEN AVE & JAYNE AVE	Unsignalized	83.28	13	9	0	0	4
44	WEST AVE & MANNING AVE	Unsignalized	82.48	9	6	0	0	3
45	HIGHLAND AVE & CLARKSON AVE	Unsignalized	82.39	9	6	0	0	3
46	CLOVIS AVE & MANNING AVE	Unsignalized	81.86	11	8	0	0	3
47	HILL AVE & ADAMS AVE	Unsignalized	81.76	10	8	0	0	2
48	LEONARD AVE & MANNING AVE	Unsignalized	81.66	10	6	2	0	2
49	NEWMARK AVE & NORTH AVE	Unsignalized	81.16	7	3	1	0	3
50	MAROA AVE & SHAW AVE	Signal	80.54	45	17	3	0	25

Notes: All unsignalized intersections are classified as rural intersections.
Other crashes include all crashes that are not coded as one of the top three collision types

Table 34. Priority Intersections with Primary Collision Factor based on Top 3 Fatal/Severe Injury Primary Collision Factors

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Improper Turning	DUI	Unsafe Speed	Other
1	LAC JAC AVE & DINUBA AVE	Unsignalized	201.09	15	0	1	3	11
2	FRANKWOOD AVE & CENTRAL AVE	Unsignalized	164.99	14	0	1	0	13
3	ACADEMY AVE & ADAMS AVE	Unsignalized	162.93	18	1	6	2	9
4	BETHEL AVE & DINUBA AVE	Unsignalized	157.25	49	4	0	3	42
5	AUBERRY RD & FRAZIER RD	Unsignalized	154.92	8	2	5	1	0
6	KEARNEY BLVD & CORNELIA AVE & MADISON AVE	Unsignalized	139.01	29	4	0	1	24
7	CLOVIS AVE & MOUNTAIN VIEW AVE	Unsignalized	137.94	19	0	3	2	14
8	BETHEL AVE & ROSE AVE	Unsignalized	135.54	25	1	0	0	24
9	CLOVIS AVE & NEBRASKA AVE	Unsignalized	133.24	20	1	0	0	19
10	MARKS AVE & JENSEN AVE	Unsignalized	132.02	19	2	4	2	11

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Improper Turning	DUI	Unsafe Speed	Other
11	AMERICAN AVE & GOLDEN STATE BLVD	Unsignalized	128.81	26	2	2	2	20
12	FRIANT RD & BELCHER	Unsignalized	128.36	15	8	2	5	0
13	BETHEL AVE & NEBRASKA AVE	Unsignalized	127.34	15	2	1	0	12
14	MCMULLIN GRD & MANNING AVE	Unsignalized	127.13	19	1	0	2	16
15	FRONTIER TRAIL LN & SAMPLE RD	Unsignalized	122.99	8	6	0	2	0
16	TEMPERANCE AVE & CENTRAL AVE	Unsignalized	121.12	13	3	0	0	10
17	TEMPERANCE AVE & JENSEN AVE	Signal	120.58	34	1	1	5	27
18	HILL AVE & SOUTH AVE	Unsignalized	118.78	11	1	2	1	7
19	PALM AVE & ASHLAN AVE	Signal	116.62	63	5	7	12	39
20	MCCALL AVE & KINGS CANYON RD	Signal	113.07	26	1	2	15	8
21	ACADEMY AVE & NEBRASKA AVE	Unsignalized	107.37	30	2	0	0	28
22	BETHEL AVE	Signal	105.38	13	0	1	0	12
23	DICKENSON AVE & KEARNEY BLVD	Unsignalized	103.69	31	1	3	0	27
24	CRAWFORD AVE & MANNING AVE	Unsignalized	102.08	28	2	0	5	21
25	DE WOLF AVE & MCKINLEY AVE	Unsignalized	98.92	27	0	0	3	24
26	ZEDIKER AVE & ROSE AVE	Unsignalized	96.98	27	1	1	2	23
27	ACADEMY AVE & MOUNTAIN VIEW AVE	Signal	96.36	31	0	2	11	18
28	AUBERRY RD & MILLERTON RD	Unsignalized	95.87	27	8	2	8	9
29	DEL REY AVE & NORTH AVE	Unsignalized	95.86	26	1	3	3	19
30	MENDOCINO AVE & DINUBA AVE	Unsignalized	92.32	18	2	0	5	11
31	KINGS CANYON RD & RIO VISTA AVE	Unsignalized	91.21	18	1	0	11	6
32	MCCALL AVE & SOUTH AVE	Unsignalized	87.88	12	2	1	3	6
33	DE WOLF AVE & JENSEN AVE	Unsignalized	87.85	16	1	0	1	14
34	BUTTONWILLOW AVE & SOUTH AVE	Unsignalized	87.65	15	0	1	1	13
35	DEL REY AVE & MCKINLEY AVE	Unsignalized	87.58	10	0	0	1	9
36	ACADEMY AVE & ROSE AVE	Unsignalized	86.42	19	2	1	2	14
37	DICKENSON AVE & SHAW AVE	Unsignalized	86.14	13	0	1	0	12
38	CHESTNUT AVE & CLAYTON AVE	Unsignalized	85.14	8	1	0	0	7
39	MCCALL AVE & JENSEN AVE	Signal	84.20	21	1	5	5	10
40	ZEDIKER AVE & DINUBA AVE	Unsignalized	84.19	12	0	0	1	11
41	LEONARD AVE & SHIELDS AVE	Unsignalized	83.90	11	1	0	0	10
42	CLOVIS AVE & DONNER AVE	Unsignalized	83.31	9	0	2	1	6
43	LASSEN AVE & JAYNE AVE	Unsignalized	83.28	13	0	0	3	10

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Improper Turning	DUI	Unsafe Speed	Other
44	WEST AVE & MANNING AVE	Unsignalized	82.48	9	1	0	2	6
45	HIGHLAND AVE & CLARKSON AVE	Unsignalized	82.39	9	0	0	1	8
46	CLOVIS AVE & MANNING AVE	Unsignalized	81.86	11	0	0	3	8
47	HILL AVE & ADAMS AVE	Unsignalized	81.76	10	0	0	4	6
48	LEONARD AVE & MANNING AVE	Unsignalized	81.66	10	1	0	0	9
49	NEWMARK AVE & NORTH AVE	Unsignalized	81.16	7	1	0	0	6
50	MAROA AVE & SHAW AVE	Signal	80.54	45	3	1	11	30

Notes: All unsignalized intersections are classified as rural intersections.
Other crashes include all crashes that are not coded as one of the top three primary collision factors
DUI = Driving Under the Influence

Table 35 and Table 36 provide information for the top ten roadway segments (based on crash severity score), including roadway classification, crash severity score, and total number of crashes by collision type or primary collision factor.

Table 35. Priority Roadways Segments with Collision Type based on Top 3 Fatal/Severe Injury Collision Types

#	Location	Classification	Crash Severity Score	Total Number of Crashes	Collision Type			
					Broad-side	Hit Object	Over-turned	Other
1	Millerton Rd (Winchell Cove to Brighton Crest Dr)	Arterial/Collector	145.02	21	0	11	3	7
2	Auberry Rd (Old Auberry Rd to Old Auberry Rd)	Arterial/Collector	144.23	18	0	12	2	4
3	Millerton Rd (Brighton Crest Dr to Sky Harbour Rd)	Arterial/Collector	136.81	10	0	6	1	3
4	Millerton Rd (Via Bellagio to East of Via Bellaggio)	Arterial/Collector	136.69	14	0	8	1	5
5	Millerton Rd (East of Via Bellaggio to West of Millerton Rd)	Arterial/Collector	136.49	13	0	8	1	4
6	Millerton Rd (West of Via Bellaggio to East of Millerton Rd)	Arterial/Collector	134.15	11	0	6	1	4
7	N Friant Rd (South of Bluff View Ave to North of N Friant Rd)	Arterial/Collector	111.61	13	1	6	2	4
8	Millerton Rd (East of North Fork Rd to West of Via Bellaggio)	Arterial/Collector	108.80	23	1	9	7	6
9	Millerton Rd (East of Winchell Cove to Brighton Crest Dr)	Arterial/Collector	107.93	14	0	7	1	6
10	E Jensen Ave (East of S Temperance Ave to West of S De Wolf Ave)	Arterial/Collector	106.11	10	3	3	0	4

Note: Other crashes include all crashes that are not coded as one of the top three collision types

Table 36. Priority Roadways Segments with Primary Collision Factors based on Top 3 Fatal/Severe Injury Primary Collision Factors

#	Location	Type	Crash Severity Score	Total Number of Crashes	Primary Collision Factor			
					Improper Turning	DUI	Unsafe Speed	Other
1	Millerton Rd (Winchell Cove to Brighton Crest Dr)	Arterial/Collector	145.02	21	15	1	1	4
2	Auberry Rd (Old Auberry Rd to Old Auberry Rd)	Arterial/Collector	144.23	18	8	6	2	2
3	Millerton Rd (Brighton Crest Dr to Sky Harbour Rd)	Arterial/Collector	136.81	10	6	0	0	4
4	Millerton Rd (Via Bellagio to East of Via Bellaggio)	Arterial/Collector	136.69	14	9	2	2	1
5	Millerton Rd (East of Via Bellaggio to West of Millerton Rd)	Arterial/Collector	136.49	13	0	2	1	10
6	Millerton Rd (West of Via Bellaggio to East of Millerton Rd)	Arterial/Collector	134.15	11	5	2	3	1
7	N Friant Rd (South of Bluff View Ave to North of N Friant Rd)	Arterial/Collector	111.61	13	6	4	2	1
8	Millerton Rd (East of North Fork Rd to West of Via Bellaggio)	Arterial/Collector	108.80	23	15	3	2	3
9	Millerton Rd (East of Winchell Cove to Brighton Crest Dr)	Arterial/Collector	107.93	14	10	1	0	3
10	E Jensen Ave (East of S Temperance Ave to West of S De Wolf Ave)	Arterial/Collector	106.11	10	3	4	2	1

Notes: Other crashes include all crashes that are not coded as one of the top three primary collision factors
DUI = Driving Under the Influence

Education Strategies

Education strategies for Unincorporated Fresno County are targeted at unsafe speed and driving or bicycling under the influence of drugs or alcohol, given the prevalence of these primary collision factors in fatal and severe injury crashes.

The Safe Roads Save Lives campaign is a marketing effort led by the Fresno COG, with the goals of:

- Educate all road users on safe transportation behaviors
- Increase safety for people walking and biking
- Highlight behaviors that cause the most crashes in Fresno County—speeding and distracted driving

SAFE ROADS SAVE LIVES

The campaign Includes branding, social media strategies, print materials, radio and video resources, school resources, and a campaign website. Unincorporated Fresno

County may find these materials helpful, especially those related to the dangers of speeding, using the roadway under the influence, and using the roadway in lower visibility conditions.

The following activities are recommended for Unincorporated Fresno County as they move forward on implementing the Safe Roads Save Lives campaign:

- Identify a team of staff appropriate to attend a presentation by Fresno COG staff about the Safe Roads Save Lives campaign. Appropriate staff members include staff associated with transportation engineering and planning, communications, traffic enforcement, school transportation, and other jurisdictional staff who work with the roadway system.
- Identify a specific staff member to be the County's lead for the Safe Roads Save Lives campaign deployment. This lead should focus on the following tasks:
    - Identify local transportation and public health advocacy groups that would be interested in helping to promote the Safe Roads Save Lives campaign. Meet with group leaders to better understand how they can participate in the campaign.
    - Identify community groups that work with migrant workers throughout the county to understand how materials about the campaign can be best distributed.
    - Work with school districts to distribute print materials and offer school-related transportation resources. Ensure that school communications are in both English and Spanish.
    - Work with public information staff to spread Safe Roads Save Lives materials throughout Unincorporated Fresno County through the following channels:
        - Independently implement social media calendar and graphics through jurisdictional accounts. At minimum, repost Fresno COG posts.
        - Have print materials (flyers, bumper stickers, pins, and postcards) available at events and community festivals.
        - Print posters for posting at governmental buildings such as libraries, DMVs, and other facilities that the public regularly uses.
        - Identify key outdoor locations in the community that would be effective for larger print advertisement, such as bus shelters, community parks, or billboard locations.
        - Create one or more radio public service announcements (PSAs) and record at least one of the PSAs in Spanish and air it on Spanish-language radio.

Emergency Services

Emergency service organizations depend on safe roadways and efficient communication processes to reach and effectively respond to emergencies. Each type of emergency services organization that serves Fresno County – law enforcement, fire, emergency medical services (EMS), California Highway Patrol – work independently and collaboratively to develop procedures that allow them to respond to incidents in their own jurisdictions as well as support others as needed. The

following recommendations may help improve emergency services response as the various organizations update procedures and policies and continue to partner on roadway safety efforts:

- All roadway safety projects should be vetted by emergency service organizations to ensure that their design does not hamper access.
- As new emergency service and response procedures are developed, roadway safety improvement opportunities should be identified and implications of changes to response times should be considered.
- Fresno County staff should participate in periodic coordination calls between emergency response agencies to gather and share recent observations about crashes and hot spots, to understand emergent safety issues that may not have led to policy reports or yet be available through statewide crash reporting systems.

Enforcement

Enforcement strategies can include programs or campaigns specifically focused on changing road user behavior through more visible and active enforcement of existing traffic laws, as well as focusing enforcement in areas that have historically been shown to have higher-than-average crash rates. Typically, the effectiveness of enforcement strategies is temporal, meaning they are effective at changing behavior for a discrete period of time – during and shortly after the increased enforcement activities.

The following enforcement strategies should be considered for Unincorporated Fresno County:

- Schedule heightened speed (or other behavior) enforcement checks during strategic times of the year, such as when students return to school or the beginning of fog season.
- Focus speed enforcement efforts in locations with high crash rates.
- Use automatic enforcement, such as red-light cameras or speed feedback signs, especially in school zones.

The effectiveness of each strategy should be measured and evaluated, considering the number of staff hours and amount of resources needed. The results should be reviewed and used to refine future enforcement activities.

Enforcement strategies should be undertaken with due caution to avoid inequitable enforcement activities and evaluated to determine the strategy's impact. More details about equitable enforcement can be found on page 8 (Introduction).

EVALUATION AND IMPLEMENTATION

A key part of achieving the County's vision is consistently evaluating roadway safety performance and tracking progress towards the County's goals. The County will develop a process to regularly collect data and information around the performance measures that can be used to assess changes city-wide and at the top priority locations.

As feasible, it is recommended that Fresno County update this LRSP every three to five years using updated crash data and the performance measures. Comparing the performance measures related to investments made with the crash data should provide a clear indication of the impact of the County's and safety partner's efforts. Future LRSPs may provide new emphasis areas and top priority locations that reflect progress made and new priorities based on trends in the data.

Activities for implementing the plan include:

- Identifying countermeasures and strategies for priority locations based on the crash data.
- Utilizing the Fresno COG Regional Safety Plan to implement regional strategies and share best practices.
- Exploring funding opportunities to implement priority strategies.
- Identifying key staff and activities to support the regional Safe Roads Save Lives campaign.
- Identifying enforcement strategies to implement and evaluate.
- Regularly coordinating with safety partner agencies to assess progress, identify opportunities to implement countermeasures and strategies, and identify opportunities for citizen involvement.
- Regularly collecting and organizing data to support evaluation of the LRSP.

6.0 CITY OF HURON

The City of Huron has an approximate population of 7,302.[35] The average daily vehicle miles traveled is 13,789, and the City maintains approximately 13 total roadway centerline miles. The main roadway in the City is Lassen Avenue, which runs from north to south . Based on the review of crash data conducted as part of the LRSP, the top collision type that included the fatal crash in Huron is **broadside**, with **sideswipe** and **rear-end** as two other common collision types. The primary collision factor for the reported fatal crash was **automobile right-of-way,** with **improper driving** as the most reported primary collision factor. The LRSP provides potential engineering, education, emergency services, and enforcement strategies tailored to Huron's crash history and local priorities, as well as performance measures to evaluate progress.

VISION AND GOALS

The City's roadway safety vision is:

Provide a City roadway network that serves the needs of the community through quality infrastructure and environment.

The City's goals in support of its vision are:

1. Have zero fatal and severe injury crashes on the City roadways.
2. Utilize community input and crash data to identify opportunities to improve roadway safety.
3. Implement low-cost engineering solutions to reduce crash risk
4. Maintain a quality roadway network for all users and modes
5. Participate in regional activities to promote roadway safety

[35] 2018 population. Source: California Department of Finance

SAFETY PARTNERS

A variety of agency staff and community partners were involved throughout the development of this LRSP and played an integral role in identifying priorities, providing local context, and reviewing the existing conditions analysis. Many of the strategies identified in this plan will require coordination with these partners and their support of the City's effort to create a culture of roadway safety. Huron's goals reflect the importance of utilizing community input and participating in regional activities to promote roadway safety. While additional partners may be identified in the future, those involved in development of the LRSP include:

- Coalinga-Huron School District
- Fresno Council of Governments
- Huron City Council
- Huron City Engineering
- Huron Elementary and Middle School
- Huron Residents

PERFORMANCE MEASURES

Performance measures are used to track progress and a key element of making data-informed decisions. Performance measures that support the City's vision, goals, and emphasis areas include:

- Annual number of crashes (city-wide and at each of the top 15 priority locations)
- Annual number of fatal and severe injury crashes (city-wide and at each of the top 15 priority locations)
- Annual number of pedestrian and bicycle crashes (city-wide and at each of the top 20 priority locations)
- Annual number of broadside crashes (city-wide)
- Annual number of sideswipe crashes (city-wide)
- Annual number of rear end crashes (city-wide)
- Investments made in roadway safety countermeasures (e.g. dollars spent, grants pursued, partnerships developed)
- Investments made in education and enforcement strategies (e.g. dollars spent, grants pursued, partnerships developed)
- Coordination with other local agencies and/or safety partners (e.g. meetings held, projects pursued)
- Opportunities provided for citizen engagement (e.g. meetings held, public campaigns launched)
- Coordination on crash data processes and reporting (e.g. meetings held, changes made)

As part of plan implementation, the City will identify a process for annually tracking these performance measures to support future updates to this roadway safety plan.

DATA SUMMARY

The primary data sets used to inform the technical analyses for the City's local road safety plan were crash data and roadway network information. As noted below, future updates could incorporate traffic volume data if widely available for locations across the City. In addition, feedback from a publicly available survey was documented for consideration in identifying issues and improvement strategies.

Public Survey Feedback

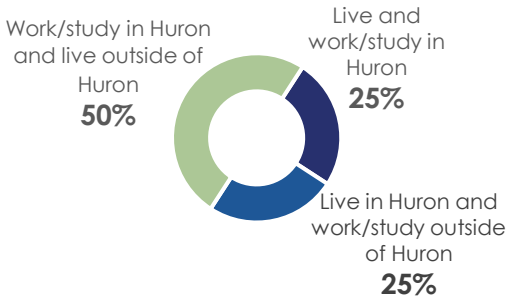
Toole Design Group worked with Fresno COG to develop an online survey and interactive webmap to provide the opportunity for public engagement on the LRSP. The goal was to collect both general and geographically specific feedback on safety problems, desired safety improvements in jurisdictions that are part of the MLRSP, as well as voluntary demographic information for Title IV reporting. Both activities were open from August 16, 2021 to September 20, 2021 and sought public feedback on spatial patterns of traffic safety concerns and desired improvements.

As the primary open public engagement opportunity during MLRSP development, the survey and interactive webmap served a crucial role in illuminating the community's traffic safety concerns and desired traffic safety improvements. Below is a summary of key findings from the online survey and interactive webmap specific to Huron. More information on the methodology and overall findings of the survey are provided in *Appendix A*.

4
PEOPLE RESPONDED

0
LOCATIONS IDENTIFIED

WHERE PARTICIPANTS WORK AND LIVE



MOST NEEDED SAFETY IMPROVEMENTS

- Traffic signals
- Pedestrian crossing improvements
- Rural road improvements to prevent run-off-road crashes
- Sidewalks

- The survey asked respondents to provide input on the top road safety improvements needed in their communities. While the survey prompted participants to pick three improvements, some selected more than three responses. A total of 22 responses were received for Huron from 4 participants, with the most common desired improvement types including:
    - Traffic signals (4 responses)
    - Pedestrian crossing improvements (3 responses)
    - Rural road improvements to prevent run-off-road crashes (3 responses)
    - Sidewalks (3 responses)
- Participants dropped points in the webmap in specific locations across Fresno County where they experienced road safety concerns. No locations were identified in Huron.
- The survey asked participants where they live and work or study, with the option to select either outside of Fresno County or from a list of jurisdictions within the County. The participants who selected Huron included:
    - 1 who lives and work/study in Huron
    - 1 who lives in Huron and works/studies outside of Huron
    - 2 who work/study in Huron and live outside of Huron

Crash Data

Integrated Traffic Records System (SWITRS) database, supplemented with location information from the Transportation Injury Mapping System (TIMS) database maintained by SafeTREC at the University of California, Berkeley. Throughout this report, crashes are associated with a jurisdiction based on the reporting officer's assessment of location.

The crash database represents the time period from January 1, 2015 through December 31, 2019 and includes reported crashes that occurred on public streets. Within the assembled regional crash database, a total of 18 reported crashes are located in Huron. Crash severity is coded according to the highest degree of injury exhibited, and the data used for this analysis includes the following coded severity levels (listed in descending order):

- Fatal: death from injuries sustained in the crash.
- Severe Injury: Injuries include, for example, broken bones, severe lacerations, or other injuries that go beyond the reporting officer's assessment of "other visible injuries."
- Other visible injury: An injury, other than those described above, that is evident to observers at the scene of the crash. For example, bruises or minor lacerations.
- Complaint of pain: Internal or other non-visible injuries. For example, a person limps or seems incoherent.
- Property damage only (PDO): No injuries sustained.

Roadway Network Data

Kittelson developed a linear referencing system of all public roadways using the Fresno County roadway centerline file. This dataset was updated to develop a measurement system based on the total road length (as determined by roadway name) to locate crashes to a specific mile point along the network. The master roadway network for the County was used to spatially analyze and prioritize specific locations within each local jurisdiction.

Traffic Volume Data

Traffic volume data was not consistently available at a sufficient level to be able to incorporate into the safety analysis. Future updates to the City's local road safety plan could incorporate traffic volume data, if available, to understand how crash frequency, severity, and type vary at different levels of traffic.

EXISTING ROADWAY SAFETY PERFORMANCE

The findings in this section are based on the crash database, which includes reported crashes from January 1, 2015 through December 31, 2019. It is organized as follows:

- All Road Users
  - Severity by Road User
  - Year, Month, and Weather
  - Collision Type
  - Location, Collision Type, and Severity
  - Primary Collision Factor
  - Lighting
  - Time of Day
- Pedestrian-involved Crashes
  - Year and Month
  - Pedestrian Action and Location
  - Lighting
- Bicyclist-involved Crashes
  - Collision Type
  - Primary Collision Factor
  - Lighting