Recommendations to Improve Pedestrian & Bicycle Safety for the Missouri Flat Area (El Dorado County)

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California Walks
Stepping Up for Health, Equity, & Sustainability

Berkeley SafeTREC
SAFE TRANSPORTATION RESEARCH AND EDUCATION CENTER

Recommendations to Improve Pedestrian & Bicycle Safety for the Missouri Flat Area (El Dorado County)

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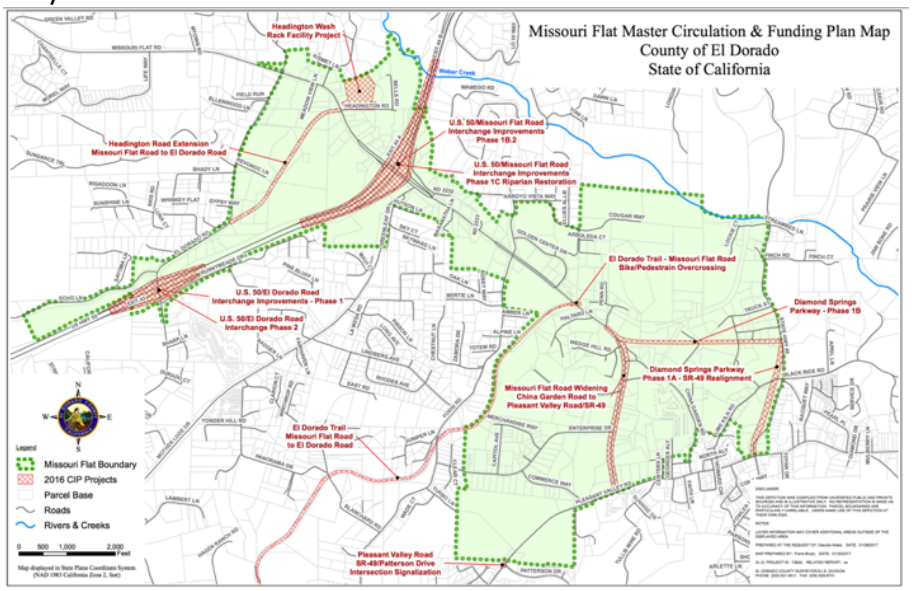
Introduction

At the invitation of the El Dorado County Health and Human Services Agency Public Health Division, the University of California at Berkeley's Safe Transportation Research and Education Center (SafeTREC) and California Walks (Cal Walks) facilitated a community-driven pedestrian and bicycle safety action-planning workshop in Missouri Flat area of El Dorado County to improve pedestrian safety, bicycle safety, walkability, and bikeability in the area. The Missouri Flat area is located in the unincorporated County west of the City of Placerville and has long been designated as a central hub of commercial activity in the County.



Map of Missouri Flat area.

Prior to the workshop, Cal Walks staff conducted an in-person site visit on Friday, May 12, 2017, to adapt the Community Pedestrian and Bicycle Safety Training program curriculum to meet the local communities' needs and to provide context-sensitive example strategies for the community's existing conditions. Cal Walks facilitated the workshop on June 23, 2017, which consisted of: 1) an overview of multidisciplinary approaches to improve pedestrian and bicycle safety; 2) three walkability and bikeability assessments along three key routes; and 3) small group action-planning discussions to facilitate the development of community-prioritized recommendations to inform El Dorado County's active transportation efforts for the Missouri Flat area. This report summarizes the workshop

proceedings, as well as ideas identified during the process and recommendations for pedestrian and bicycle safety projects, policies, and programs.

Background

Community Pedestrian and Bicycle Safety Training Program

The Community Pedestrian and Bicycle Safety Training (CPBST) program is a joint project of UC Berkeley SafeTREC and Cal Walks. Funding for this program is provided by a grant from the California Office of Traffic Safety (OTS) through the National Highway Traffic Safety Administration (NHTSA). The purpose of the CPBST program is to train local neighborhood residents and safety advocates on how to improve pedestrian and bicycle safety and to strengthen their collaboration with local officials and agency staff to make communities safer and more pleasant to walk and bike. For each training, the program convenes a multi-sector, multi-disciplinary local planning committee to tailor and refine the training's curriculum and focus to meet the community's needs. Additionally, Cal Walks staff conduct pre-training site visits to collect on-the-ground observations of existing walking and biking conditions to inform the training's scope and focus.

The half-day training is designed to provide participants with both pedestrian and bicycle safety best practices and a range of proven strategies (the 6 E's: Empowerment & Equity, Evaluation, Engineering, Enforcement, Education, and Encouragement) to address and improve pedestrian and bicycle safety conditions and concerns. Participants are then guided on a walkability and bikeability assessment of nearby streets before setting pedestrian and bicycle safety priorities and actionable next steps for their community.

For a summary of outcomes from past CPBST workshops, please visit:
www.californiawalks.org/projects/cpbst and https://safetrec.berkeley.edu/programs/cpbst

Selected Pedestrian & Bicycle Safety Conditions in the Missouri Flat Area

High Speeds on Missouri Flat Road

The principal street in the area is Missouri Flat Road, which has posted speed limits of 45 MPH. Missouri Flat Road is a very wide street (about 100 feet from curb to curb), and the width of the street and travel lanes are documented to encourage drivers to travel at higher speeds. Research has demonstrated that wide streets and wide travel lanes are associated with higher vehicle speeds, which affect the safety of people walking and bicycling.[1] High speeds along Missouri Flat Road are exacerbated by the US 50 interchange, where drivers are either accelerating to highway speeds or continuing to travel at highway speeds once off the highway. The high speeds and wide design create an uncomfortable environment for pedestrians who walk along and cross the street to access the businesses, transit, and housing located along and adjacent to Missouri Flat Road.

[1] See Kay Fitzpatrick, Paul Carlson, Marcus Brewer, and Mark Wooldridge, "Design Factors That Affect Driver Speed on Suburban Arterials": Transportation Research Record 1751 (2000):18–25.

High speeds on Missouri Flat Road.

Challenging Terrain

The mountainous terrain of El Dorado County, in general, and the Missouri Flat corridor in particular, constrain most street widths. Generally, the streets are more similar to Forni Road and Golden Center Drive than Missouri Flat Road. These streets are typically 30-40 feet wide and rarely have shoulders or sidewalks due to these roads being bounded on either side by drop offs. Many streets are winding as well. Despite these conditions, many drivers still travel at high speeds in close proximity to people walking and biking on the shoulder or on the roadway.

Many streets in the community are narrower and constrained by the geography and terrain.

Gaps in Pedestrian and Bicycle Network

In the Missouri Flat area, key destinations exist in areas that lack connectivity to existing pedestrian and bicycle infrastructure. In particular, sidewalks and bike lanes do not exist from the commercial developments on Missouri Flat Road to connect to Herbert C. Green Middle School and the Gold Country Retirement Center. These gaps create safety challenges to both the senior residents and students who walk and bike in the area and who are forced to walk and bike in the street itself.

The discontinuous sidewalk network and inconsistent presence of curb ramps force pedestrians, particularly those using wheelchairs or assistive devices, to walk or roll in the street.

Challenging Crossing Conditions Across Slip Turn Lanes

During Cal Walks' site visit, we observed numerous slip turn lanes (or free, uncontrolled right turn lanes) that create difficult crossing conditions for pedestrians. These lanes have very wide turning radii, which enable drivers to make turns at very high speeds. Some of these slip turn lanes even lacked crosswalk markings to communicate clearly to drivers to slow down and stop for people crossing.

Numerous slip turn lanes in the community create difficult crossing conditions for pedestrians (some better than others).

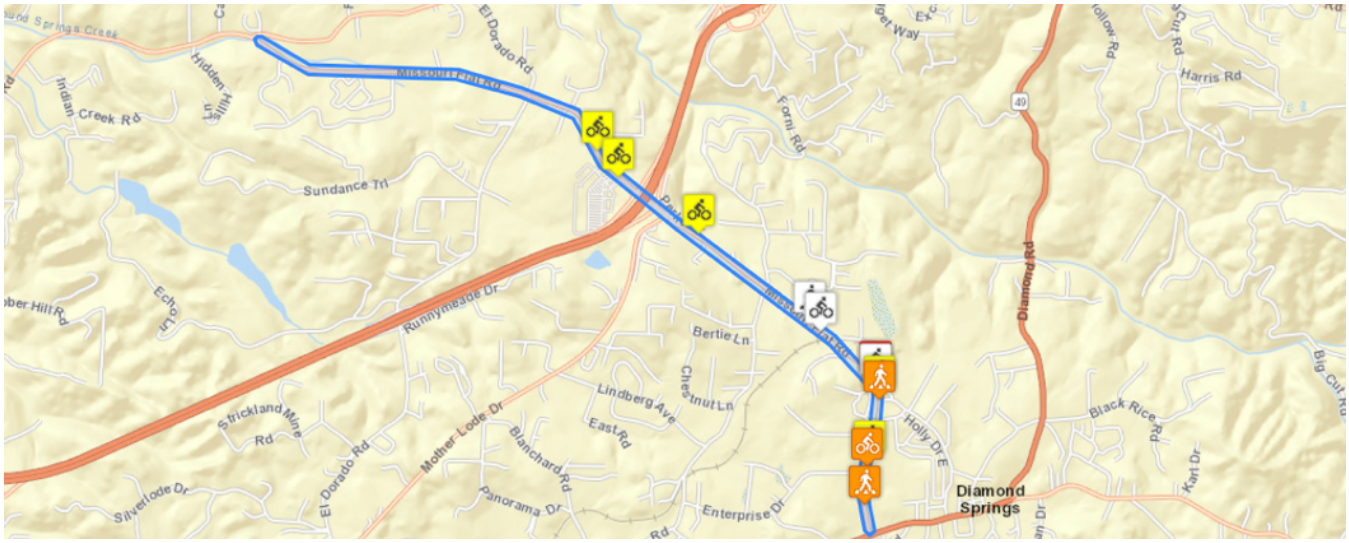
Numerous slip turn lanes in the community create difficult crossing conditions for pedestrians (some better than others).

Pedestrian & Bicycle Collision History

Between 2006-2015,[2] there were 221 pedestrian collisions–including 98 fatalities and 123 severe injuries– and 271 bicycle collisions–including 121 fatalities and 164 severe injuries–in El Dorado County, with collisions concentrated in South Lake Tahoe, the Placerville area, and US 50 near El Dorado Hills. Looking at data for El Dorado County as a whole may be misleading because the conditions of the West Slope communities (of which Missouri Flats is one) are quite different from those of the Tahoe Basin communities. The West Slope communities face safety concerns similar to many other rural areas that have seen regional commercial growth, while the Tahoe Basin communities; concerns center on their large influxes of tourists and seasonal visitors.

Zeroing in on the Missouri Flat corridor itself, we see that between 2006-2015, there were 4 pedestrian collisions on Missouri Flat Road–between Green Valley Road and Pleasant Valley Road–including 1 fatality and 2 severe injuries and 8 bicycle collisions including 1 severe injury. However, for the entire County, pedestrian and bicycle collisions appear to be on a downward trajectory over the last 10 year period for which we have data.

[2] Please note 2014 and 2015 data is provisional.



2006-2015 pedestrian and bicycle collisions on Missouri Flat Road between Green Valley Road and Pleasant Valley Road. Source: Transportation Injury Mapping System.

A full discussion of the pedestrian and bicyclist collision data prepared by UC Berkeley SafeTREC for the County can be found Appendix A.

June 23, 2017 Workshop

El Dorado County Health and Human Services Agency Public Health Division requested a workshop to 1) provide County staff, community organizations, and residents with a toolkit for promoting pedestrian and bicycle safety to inform future active transportation projects; 2) strengthen working relationships between the County Health and Human Services Agency Public Health Division, County Transportation Commission, County Department of Transportation, the Placerville Mobility Support Group, and other stakeholders to ensure the best outcomes for the residents of the Missouri Flat area; and 3) develop consensus regarding pedestrian and bicycle safety priority and actionable next steps.


Participants learning and discussing the 6 E's approach to pedestrian and bicycle safety.

The workshop was hosted from 11:00 am to 3:30 pm, and lunch was provided to maximize community participation. Twenty (20) individuals attended the workshop, including representatives from:

- Herbert C. Green Middle School;
- El Dorado County Department of Transportation;
- El Dorado County Commission on Aging;
- El Dorado County Transportation Commission;
- El Dorado County Health and Human Services Agency Public Health Division
- El Dorado Community Advisory Committee;
- Active Living Leadership;
- WALKSacramento;
- Placerville Mobility Support Group;
- California Highway Patrol; and
- Local residents and community leaders who serve on numerous local community boards and commissions.

Reflections from Walkability & Bikeability Assessment

Workshop participants conducted walkability and bikeability assessments along 3 routes:

- Route 1 traveled along Golden Center Drive and Missouri Flat Road and examined walking and biking conditions along these two roads, as well as connections to the El Dorado Trail.
- Route 2 one behind Golden Center Drive focused on examining the middle school field and connections to the Gold Country Retirement Center.
- Route 3 traveled to the Missouri Flat Road and US 50 interchange to examine walking, biking and crossing conditions in the area.

Participants were asked to 1) observe infrastructure conditions and the behavior of all road users; 2) apply strategies learned from the 6 E's presentation that could help overcome infrastructure concerns and unsafe driver, pedestrian, and bicyclist behavior; and 3) identify positive community assets and strategies which can be built upon.

Following the walkability and bikeability assessment, the participants shared the following reflections:

- **Discontinuous Sidewalks Network:** Along Forni Road, Golden Center Drive, and other streets adjacent to Missouri Flat Road, there are numerous sidewalk gaps that forced workshop participants to walk on the shoulder of the road. On Forni Road, participants noted that drivers were traveling dangerously fast, further endangering individuals traveling on the shoulder. Wide curb radii throughout the area also encourage drivers to make turns at high speeds.
- **High Speeds & Difficult Crossings on Missouri Flat Road:** Participants underscored high speeds as the largest barrier for people walking along Missouri Flat Road. High traffic volumes and noise pollution from traffic also affected the walking experience in the area. Additionally, participants noted that at the marked signalized crossings at Golden Center Drive, Forni Road, and US 50, the pedestrian signal phase did not appear to provide sufficient time for pedestrians to cross the road, particularly for older adults, children, and people with disabilities. Participants also commented on the long distances between signalized intersections, which are the only areas where crossings are provided. Due to these long distances between crossings, many pedestrians choose to cross outside of the provided crossings in unsafe conditions.

Pedestrian observed crossing Missouri Flat Road outside the signalized intersections, which are spaced far apart.

- **Visibility & Crossing Challenges at US 50 Interchange:** The high speeds of drivers entering and exiting at the Missouri Flat Road/US 50 Interchange create challenging conditions for people walking in the area and particularly for those attempting to cross the on-/off-ramps. Participants noted the lack of crosswalk markings at the on- and off-ramps and that there did not appear to be enough time provided to cross the on- and off-ramps. In the interchange area, all crossings across Missouri Flat Road are prohibited. With commercial areas already on either side of US 50 and with more commercial development planned for the area, participants identified pedestrian access and safety in the interchange area as critically important. Participants did note that a push button at the Safeway at the bottom of the interchange on the north side has now been made more accessible. They would like to see more of these improvements in the interchange area.

Lack of crosswalk markings or pedestrian warning signage at US 50 on- and off-ramps.

Participants during walk assessment contending with drivers encroaching upon marked crosswalk areas.

Community Resident Recommendations

Following the walkability and bikeability assessment, Cal Walks facilitated small-group action planning discussions. Workshop participants discussed a series of questions developed in conjunction with local partners, including:

- The first set of questions focused on identifying education and encouragement programs that would be most effective for the community and on identifying strategies to best collaborate with local officials and agency staff to make El Dorado County safer and more pleasant to walk and bike.
- The second set of questions focused on identifying complete streets improvements participants would you like to see in the Missouri Flat area, identifying strategies for improving connections to transit, and discussing how the County should prioritize which projects to pursue.

Participants engaged in small group action planning discussions.

Workshop participants provided the following recommendations for overall pedestrian and bicyclist safety improvements:

Education and Encouragement Programs

- **Integrating Walk & Bike Safety in General Plan Update:** Participants identified leveraging the County General Plan update process and Healthy Communities element to strengthen actionable aspects for walkability and bikeability in El Dorado County. This process provides an opportunity to foster collaboration between agencies and encourage active community participation at meetings. Participants consider it critical to ensure community feedback and ideas are documented and tracked.
- **Develop a Community Public Outreach and Education & Encouragement Campaign:** Participants identified the development of a community safety education campaign about the importance of walking and biking for Missouri Flat as a priority next step. Participants discussed partnering with law enforcement agencies to educate drivers about traffic safety, particularly at Forni Road and Missouri Flat Road when school goes back into session. Participants identified the key messages for the campaign to be communicating the effect speed has on safety, as well as promoting healthier, more active communities.

  Participants identified organizing activities as a strategy to communicate and disseminate the campaign's materials, including through annual Walk/Bike to School Days, at farmers markets, and at El Dorado Trail trailhead. Participants also identified partnering with El Dorado Transit as another strategy to broadcast the campaign. Lastly, participants identified drivers, seniors, and children as the three primary audiences of the education and encouragement campaign.
- **Intergenerational Encouragement Programs for Safety:** Participants strongly supported adopting an intergenerational approach to education, encouragement, and engagement programs. One initial project that participants identified was for middle school youth to work with Golden Country Retirement Center seniors to conduct community-led walk audits and to document their findings with PhotoVoice or VideoVoice component. The walk audit findings could be presented to the Board of Supervisors to educate the Supervisors about residents' safety concerns. Another potential project idea is to launch a walking school bus program with seniors helping to lead the walking groups. Additionally, following educating and engaging residents of Gold Country Retirement, possibly through a senior center educational walking program, walking school buses for students led by seniors might be established.
- **Creating a Sense of Community Identity:** Participants noted that one of the barriers to creating change in the area was the lack of a sense of community identity in the Missouri Flat area. Participants noted the possibility of expanding the existing Diamond Springs community identity to the Missouri Flat area, rather than create a new identity for the region. Participants identified the use of branded wayfinding signage and maps and working with local businesses to help inform the branding as next steps for this action.

Collaboration with Agencies and Officials

- **Expand Advisory Committees' Discussions to Integrate Active Communities Issues:** Participants identified the need for existing advisory committees, boards, and commissions to be more holistic by integrating issues related to active living and pedestrian and bicycle safety. Additionally, participants identified the creation of an Complete Streets Advisory Committee as

part of the Board of Supervisors as a priority, as well as a youth-driven coalition modeled after the Commission on Aging or the Placerville Mobility Support Group.

Infrastructure & Connectivity Priorities

- **Develop a Safe Circulation/Safe Routes to School Plan for Herbert C. Green Middle School:** Participants identified the need for a comprehensive Safe Circulation/Safe Routes to School Plan for Herbert C. Green Middle School. Participants noted that the plan should include robust local outreach and community engagement to determine infrastructure priorities and to gather data to inform future improvements. Participants identified numerous issues that the plan should address including: evaluation of a remote drop off area for the school; exploring the creation of a track connecting to the private road and making the track a "joint use" facility that is open to the public; and addressing ingress/egress at Forni Road and Golden Center.

Traffic conditions that participants hope a Safe Circulation/Safe Routes to School Plan can help address.

- **Complete & Accessible Pedestrian Facilities Network:** Participants strongly supported efforts to implement a complete and accessible pedestrian facilities network, including sidewalks, enhanced crossings, curb ramps, and other accessibility improvements. Participants identified completing sidewalk gaps along Missouri Flat Road to increase access to the commercial developments along Missouri Flat Road and to the El Dorado Trail as a priority. A secondary priority is to address the sidewalk gaps from Golden Center Drive to the middle school's entrance, which could possibly be accomplished through leveraging incoming commercial development impact fees.

  In addition to sidewalk gaps, participants would like to see existing crossings upgraded to high-visibility markings and for rectangular rapid flashing beacons to be installed in the crossings closest to the middle school and retirement center. Participants also identified the need for pedestrian signal timing on Missouri Flat Road to be evaluated and re-timed to accommodate children, seniors, and people with disabilities. Lastly, participants supported the use of curb

extensions and temporary curb extensions to slow drivers turning onto or off Missouri Flat Road.

- **Upgrade Bicycle Facilities on Missouri Flat Road:** Participants said that the bike lane on Missouri Flat Road was not adequate for the speed and traffic volumes of the street as currently marked. Participants supported widening shoulders on Missouri Flat Road or marking new buffered bike lanes to ensure a continuous bicycle facility.
- **Improve Crossing Conditions at Missouri Flat Road/US 50 Interchange:** Participants emphasized that the current design of the on- and off-ramps onto US 50 encourages drivers to travel at high speeds, creating unsafe conditions for pedestrians who have to cross multiple on- and off-ramps. Participants supported both short-term improvements (such as crosswalk markings and signage), as well as longer-term improvements (such as redesign of the interchange).
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California Walks/SafeTREC Recommendations

California Walks and SafeTREC also submit the following recommendations for consideration by El Dorado County agencies:

- **Improve Crossing Conditions at Missouri Flat Road/US 50 Interchange:** Cal Walks and SafeTREC strongly supports participants priority for improving the crossing conditions at the interchange. We recommend the County work with Caltrans to implement immediate near-term improvements including pedestrian crossing warning signage, installing high-visibility crosswalk markings at on- and off-ramps, and increasing pedestrian signal timing. In the medium-term, we recommend the County work with Caltrans to implement a raised crosswalk at some or all of the on- and off-ramps at this interchange. Caltrans has implemented such a treatment in other areas of the state, and a raised crosswalk can greatly increase the visibility of pedestrians attempting to cross and address some of the speeding issues raised by residents. We also recommend that this raised crosswalk concept be explored in the ongoing development of Missouri Flat Area Master Circulation and Financing Plan Phase II, which will be considering changes to the interchange in anticipation of the approved commercial development.

Example of raised crosswalk with high-visibility crosswalk markings and warning signage. Windsor, CA

- **Implement Gateway Treatments as a Traffic Calming Measure**: Gateways can be used as a visual cue to drivers that they are entering a different environment that will require them to drive more slowly and can vary from simple monument signs to more elaborate street spanning arches. Building off participants' comments regarding the lack of a sense of place in the Missouri Flat area, we recommend the County consider implementing gateways as a strategy to convey a sense of neighborhood identity and sense of place. These gateway treatments could be developed as part of a broader local business engagement strategy with existing and new businesses. These could potentially be partially funded through incoming commercial developments. The gateway treatments could also be tied into participants' proposed wayfinding signage and could serve to tie together the area under a cohesive, thematic brand.

Acknowledgments

We would like to thank Kristin Tornincasa of the El Dorado County Health and Human Services Agency Public Health Division for inviting us into their community and for hosting the Community Pedestrian and Bicycle Safety Training.

We would like to acknowledge the many community members and agencies present at the workshop and their dedication to pedestrian and bicycle safety. Their collective participation meaningfully informed and strengthened the workshop's outcomes.

Funding for this program was provided by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.

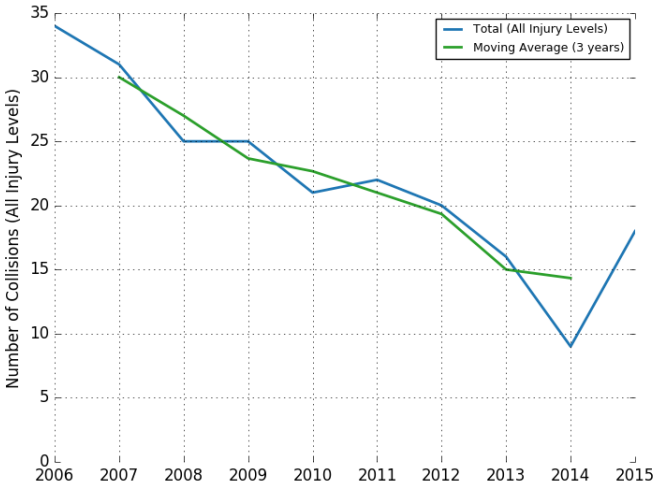
Appendix A

Pedestrian and Bicycle Collision Data Analysis

CPBST – El Dorado County, CA – June 23, 2017
Pedestrian and Bicycle Collision Analyses, 2006-15*

PEDESTRIANS

Number of Collisions Involving Pedestrians, 2006-15



The blue line shows the number of pedestrian collisions where a fatality and/or injury occurred. There were 246 people injured or killed in 221 pedestrian collisions over the last 10 years.

The green line shows the three-year moving average of the number of pedestrian collisions where a fatality and/or injury occurred. The moving average is useful for tracking trend change over time, especially when the number of collisions is subject to variability. Data points are the midpoint of the three years of data specified.

The following analyses are based on the most current five years, 2011 to 2015, of data for El Dorado County. There were 98 people killed or injured in 85 pedestrian collisions.

Top Violation Types for Collisions Involving Pedestrians

Type of Violation	Collisions N(%)
Pedestrian yield, upon roadway outside crosswalk.	23 (27.1%)
Unsafe speed for prevailing conditions (use for all prima facie limits)	12 (14.1%)
Driver must yield to pedestrian right in a crosswalk	10 (11.8%)
Starting or backing while unsafe	9 (10.6%)
Walking on roadway, other than pedestrian's left edge	6 (7.1%)
Unsafe turn with/without signaling	4 (4.7%)
Other violation	11 (13.1%)
Not stated	10 (11.5%)
Total	**85 (100%)**

Pedestrian Actions in Collisions Involving Pedestrians

Pedestrian Action	Collisions N(%)
In road, including shoulder	39 (45.9%)
Crossing Not in Crosswalk	28 (32.9%)
Crossing in Crosswalk at intersection	9 (10.6%)
Unknown or other pedestrian action	9 (10.6%)
Total	**85 (100.0%)**

* Data Source: California Statewide Integrated Traffic Records System (SWITRS). Collision data for 2014 and 2015 are provisional at this time.

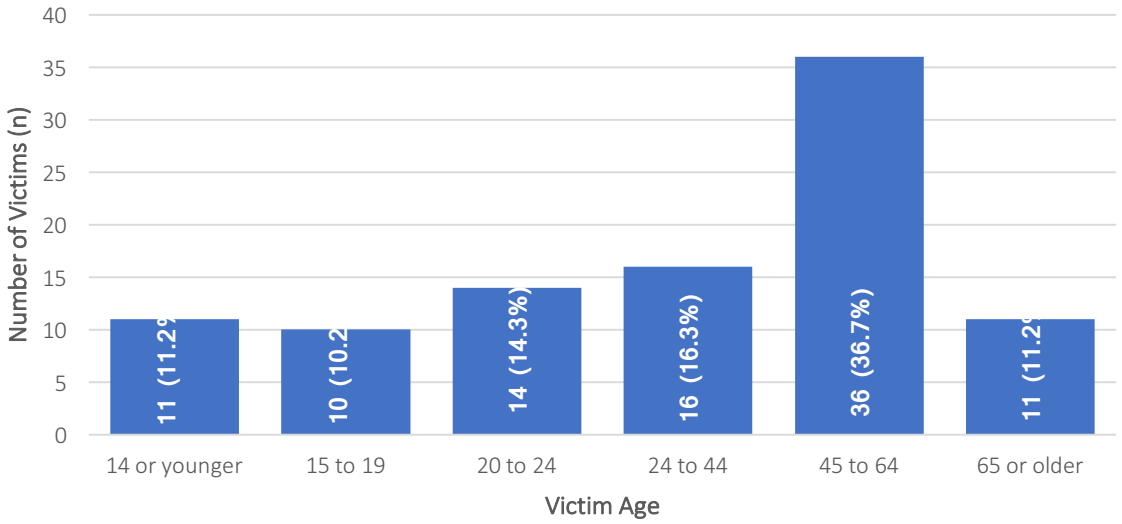
Funding for this project was provided by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.

CPBST – El Dorado County, CA – June 23, 2017

Pedestrian and Bicycle Collision Analyses, 2006-15*

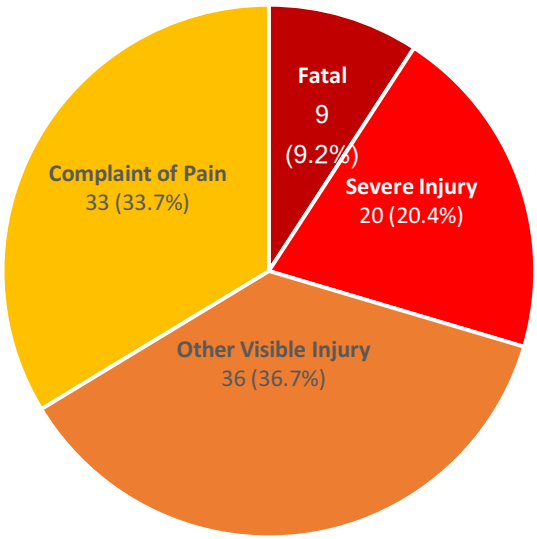
Pedestrian Victim Demographics

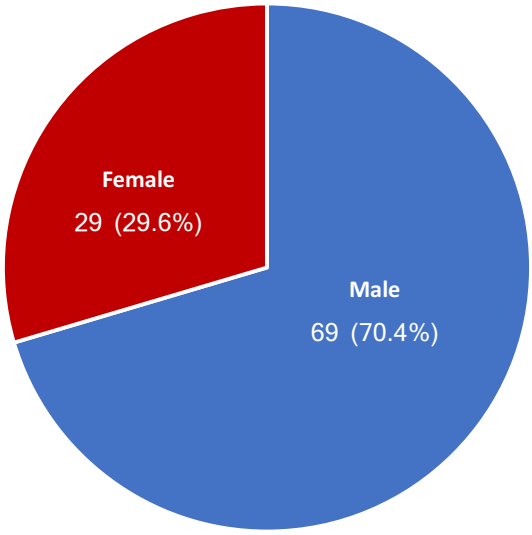
The age of pedestrian victims ranged considerably across all age groups, with youth age 19 or younger accounting for 21.4 percent of all victims. Victims were primarily male.



Victim Injury Severity, 2011-15

Most collisions resulted in minor injuries.





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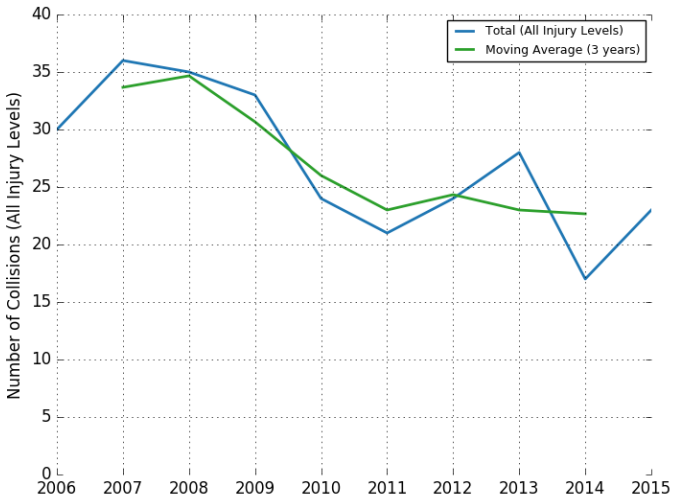
CPBST – El Dorado County, CA – June 23, 2017

Pedestrian and Bicycle Collision Analyses, 2006-15*

BICYCLISTS

Number of Collisions Involving Bicyclists, 2006-2015



The blue line shows the number of bicycle collisions where a fatality and/or injury occurred. There were 285 people killed or injured in 271 bicycle collisions over the last 10 years.

The green line shows the three-year moving average of the number of bicycle collisions where a fatality and/or injury occurred. The moving average is useful for tracking trend change over time, especially when the number of collisions is subject to variability.

The following analyses are based on the most current five years, 2011 to 2015, of data for El Dorado, CA. There were 121 people killed or injured in 113 bicycle collisions.

Top Violation Types for Collisions Involving Bicycles

Type of Violation	Collisions N(%)
Unsafe speed	25 (22.1%)
Improper turning	18 (15.9%)
Automobile right of way	18 (15.9%)
Wrong side of road	13 (11.5%)
Driving or bicycling under the influence of alcohol or drug	8 (7.1%)
Traffic signals and signs	7 (6.2%)
Other Violations	14 (12.6%)
Unknown or not stated	10 (8.8%)
Total	**113 (100.0%)**

* Data Source: California Statewide Integrated Traffic Records System (SWITRS). Collision data for 2014 and 2015 are provisional at this time.

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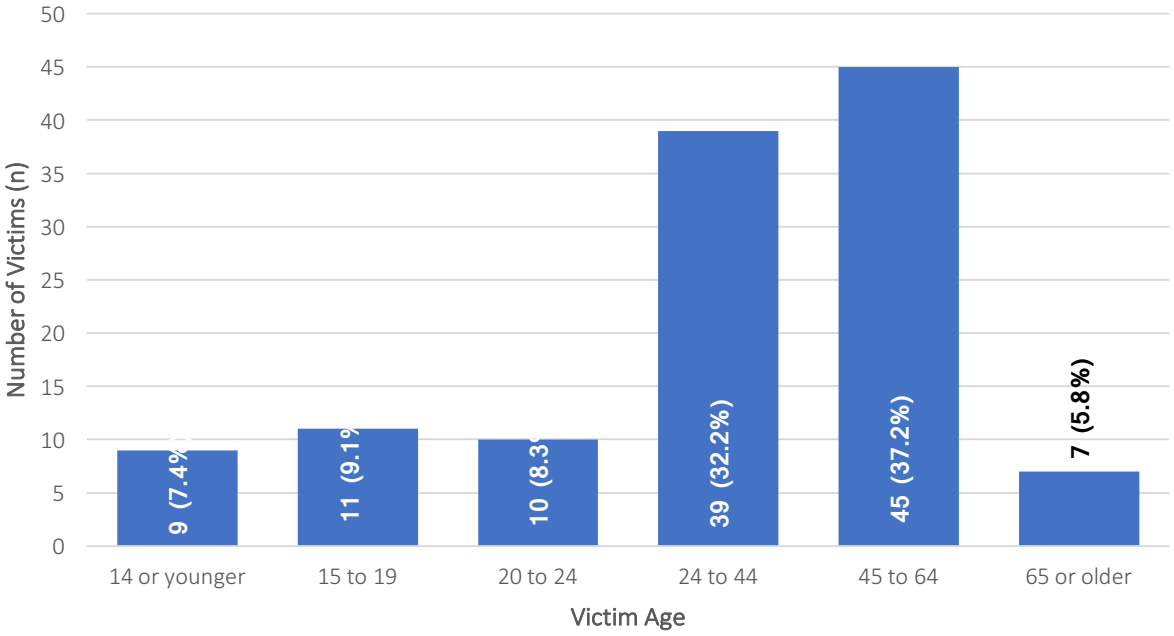
CPBST – El Dorado County, CA – June 23, 2017

Pedestrian and Bicycle Collision Analyses, 2006-15*

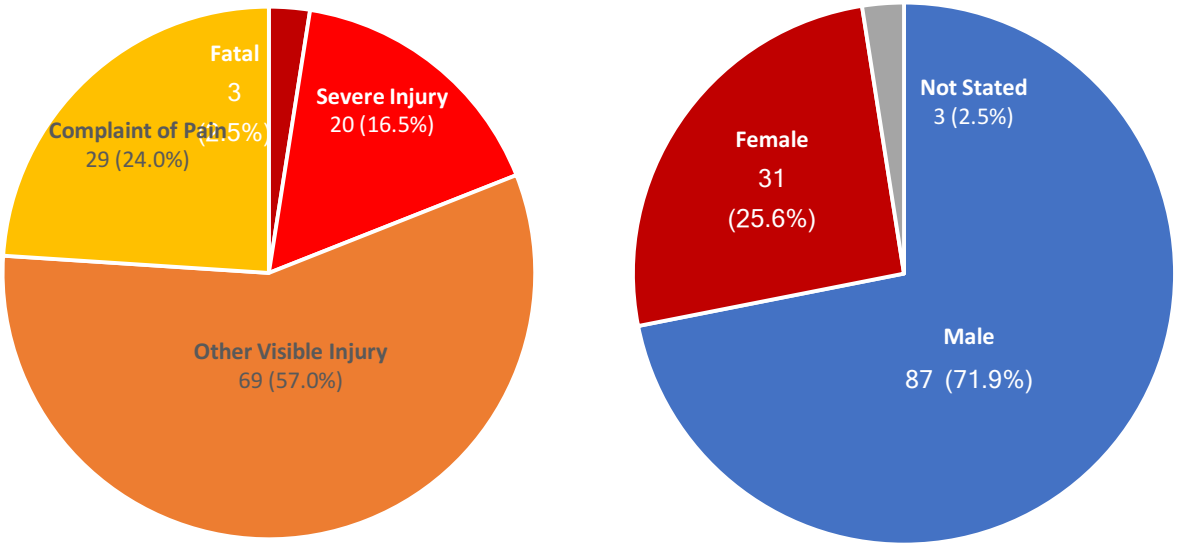
Bicycling Victims Demographics

The age of bicycling collision victims varied across all age groups, with youth age 19 or younger accounting for 16.5 percent of victims. The majority of victims were male.



Victim Injury Severity, 2011-15

Most collisions resulted in minor injuries.



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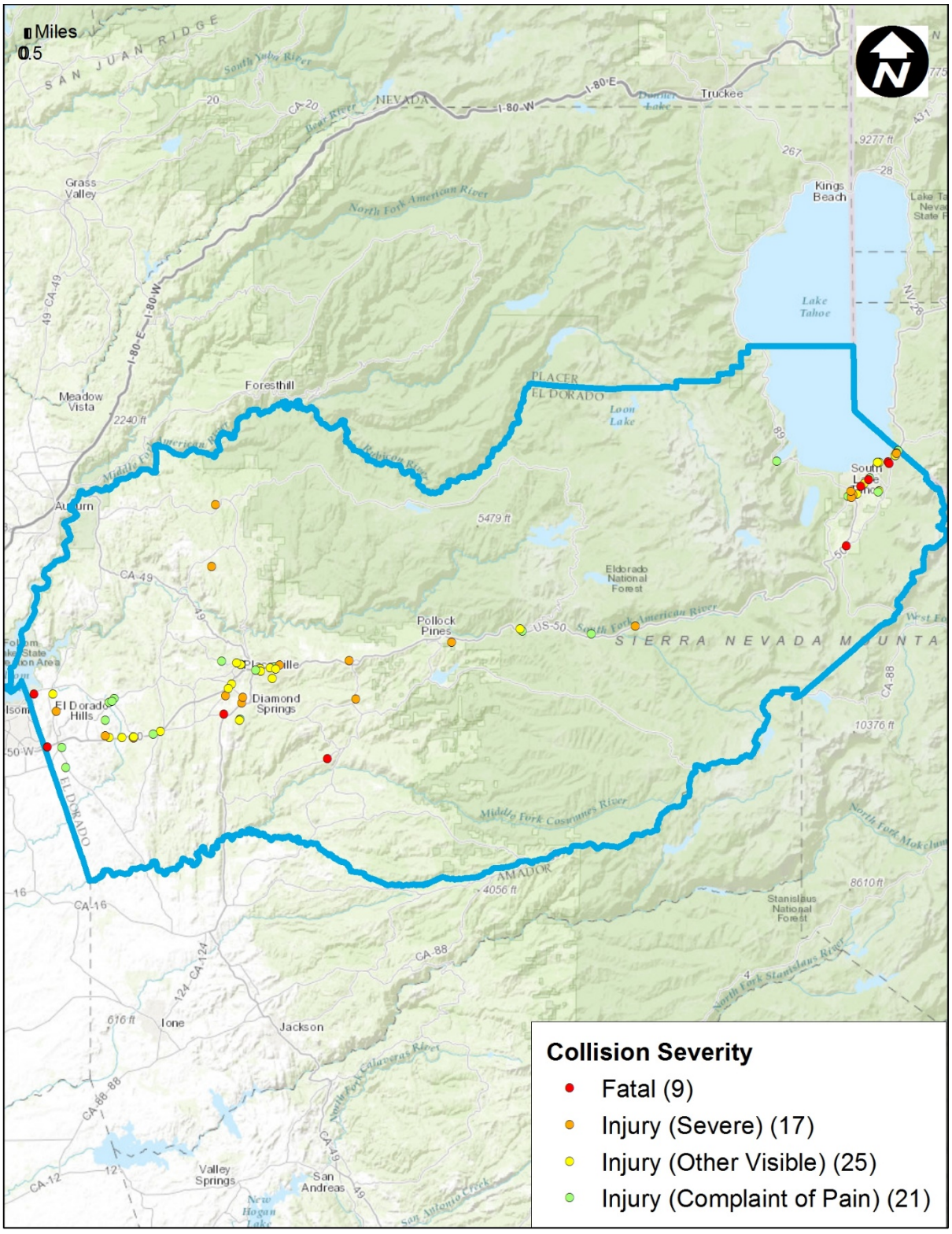
CPBST – El Dorado County, CA – June 23, 2017

Pedestrian and Bicycle Collision Analyses, 2006-15*

Pedestrian Collision Locations, 2011-15

Note: Only 72 of 85 collisions are geo-coded.



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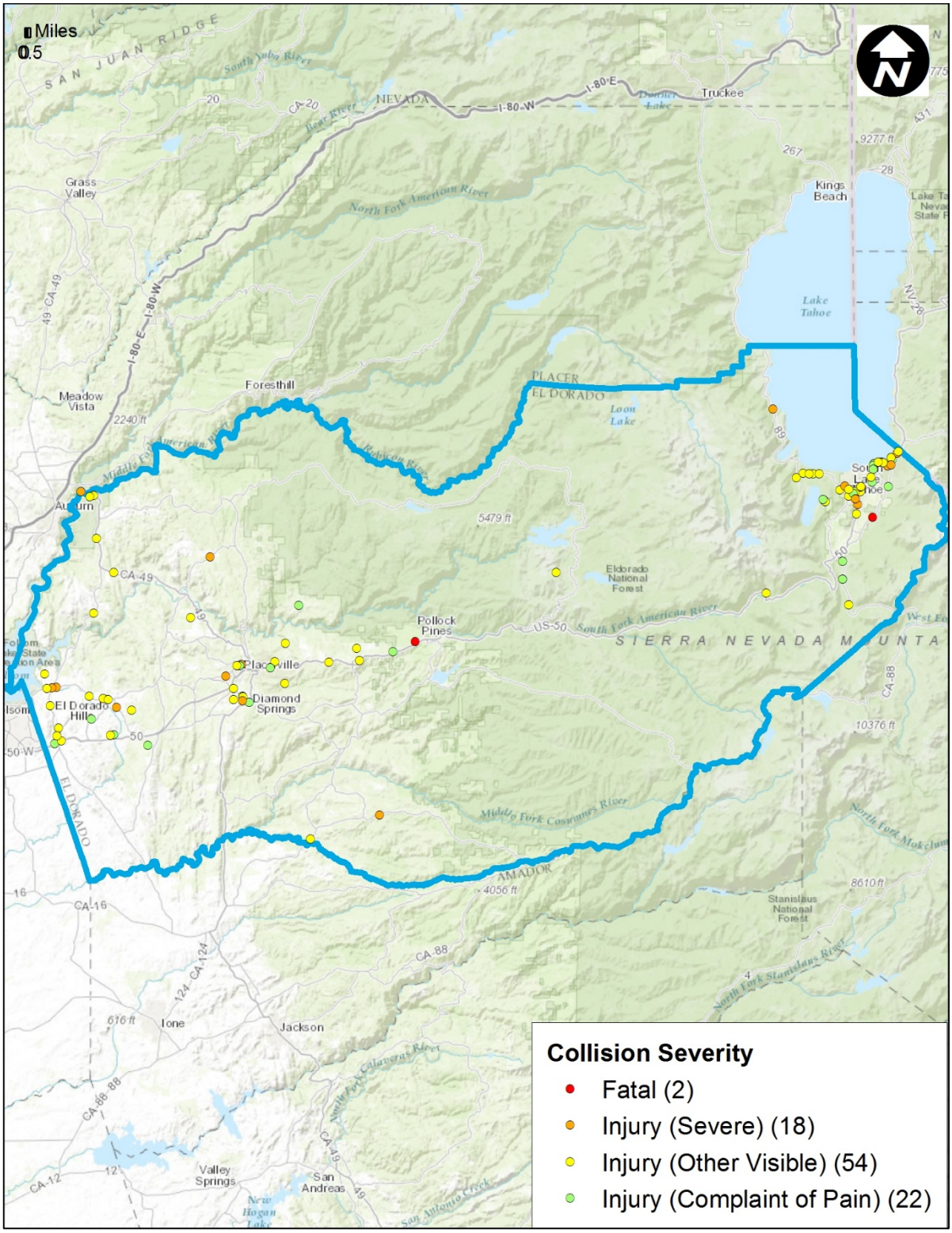
CPBST – El Dorado County, CA – June 23, 2017

Pedestrian and Bicycle Collision Analyses, 2006-15*

Bicycle Collision Locations, 2011-15

Note: Only 96 of 113 collisions are geo-coded.



* Data Source: California Statewide Integrated Traffic Records System (SWITRS). Collision data for 2014 and 2015 are provisional at this time.

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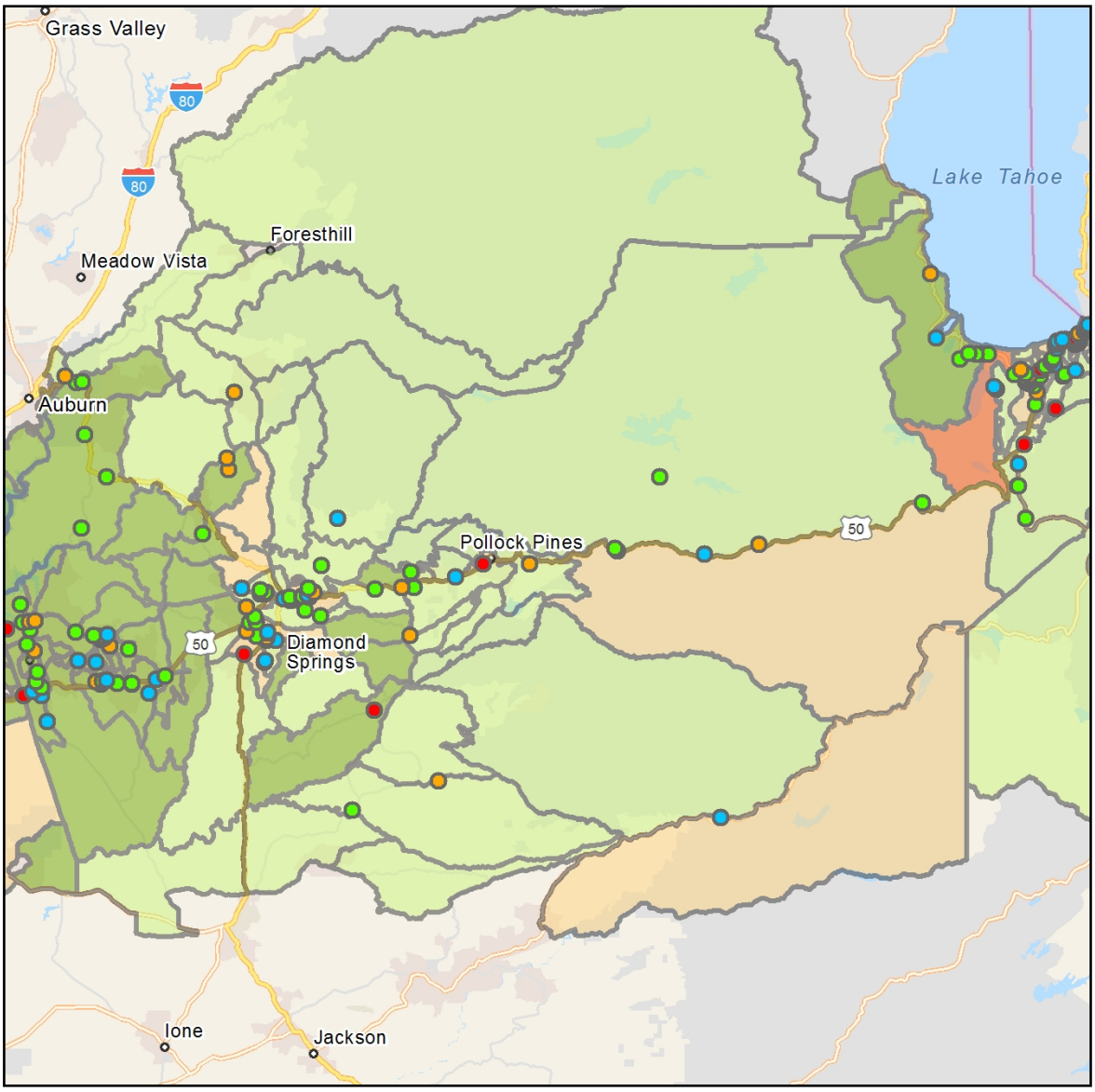
El Dorado Bicycle/Pedestrian Collision Map (2011 - 2015)



Collision Severity (2011-2015)

- Fatal (11)
- Injury (Severe) (34)
- Injury (Other Visible) (78)
- Injury (Complaint of Pain) (44)

2016 Median Household Income

- < 35K
- 35K - 50K
- 50K - 75K
- > 75K

Berkeley SafeTREC

Data Source: Collision - SWITRS 2011 - 2015 (2014 - 2015 data is provisional)
Demographics - Esri, US Census Bureau, and ACS
Date: 5/12/2017

This map shows where all the pedestrian/bicycle injury collisions occurred and may not extend to the city's boundaries.