Informing Crash Modification Factors with LiDAR Analysis

Traffic Safety Summit | September 13th 2023

alta

Introduction

Cole Peiffer, AICP

- Associate Planner – Alta Planning + Design

Scot Kelley, Ph.D

- Associate Professor – University of Nevada, Reno

Introduction

National Science Foundation – Smart & Connected Community Grant Program

A multidisciplinary approach to assessing city-wide near misses between vehicles and vulnerable road users in Reno-Sparks, Nevada

(Currently under Phase 1 of 2)

More information: www.RenoSparksNearMiss.com

The Big Idea

alta

The Big Idea

Vulnerable road users (people walking, biking, scooting, etc.) are highly sensitive to safety issues due to the significant potential for serious injury or death.

Safety for a person walking, biking, or scooting includes the crashes that happen **AND those that almost did. (aka. Near Miss)**

"Near-misses" impact the perceived safety of a person walking, biking, or scooting, and may make them shift away from those modes.

These "Near-Misses" have never been part of the dataset in a meaningful way.

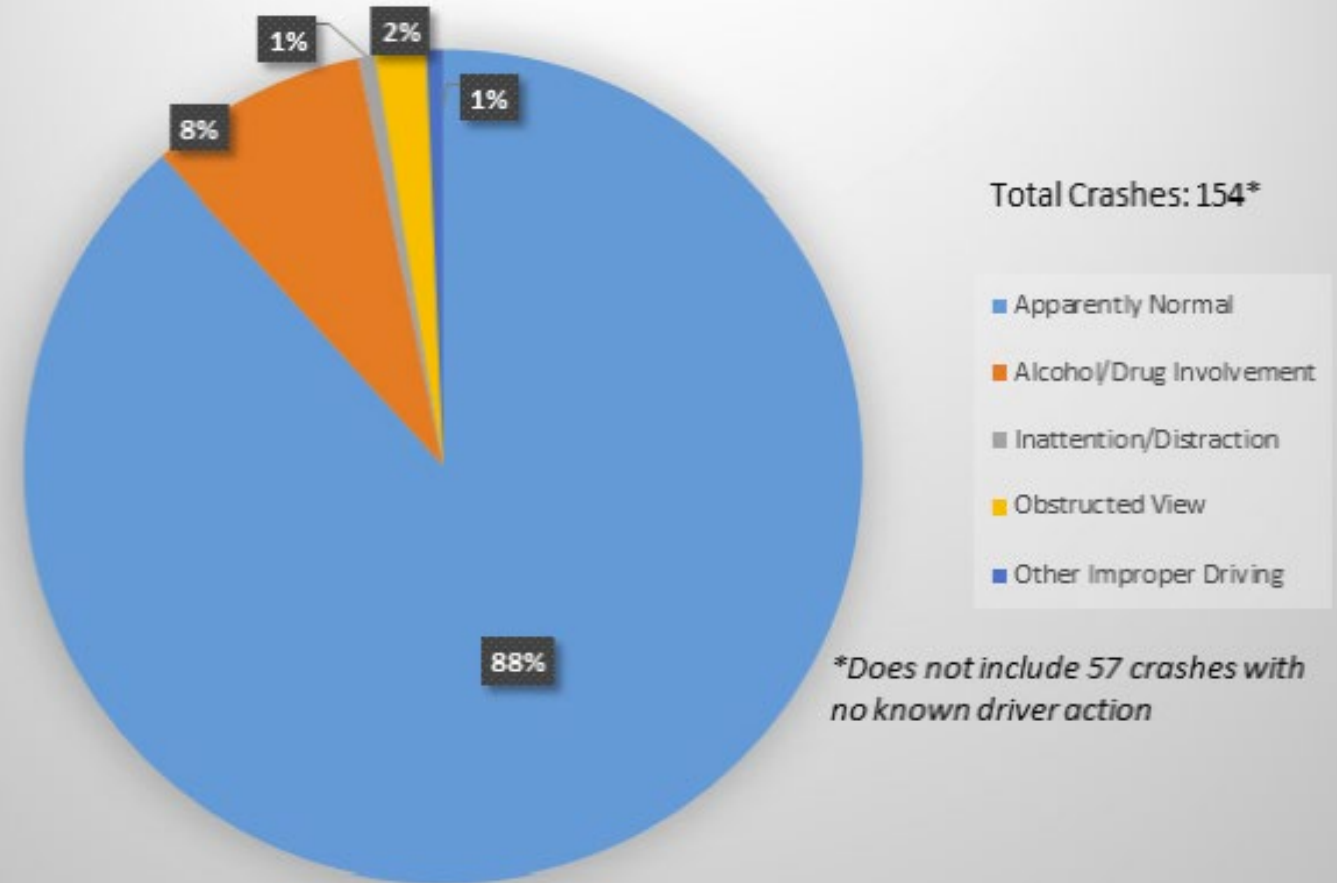Current data available to decision makers is limited and misses the full picture of safety.

This translates to tools and metrics which may miss the full picture of safety.

Data-Driven Pedestrian & Bicycle Safety

Planning Limitations of Data

- Small total number of crash data records

- Generally geo-located (center of intersection)

- Identifying trends can be difficult

- Insights are as good as available data attributes

- These crashes are typically under-reported

2011-2017 All 4 Study Areas
Crashes with Known Driver Actions

Total Crashes: 154*

- Apparently Normal
- Alcohol/Drug Involvement
- Inattention/Distraction
- Obstructed View
- Other Improper Driving

*Does not include 57 crashes with no known driver action

1% 8% 1% 2% 1% 88%
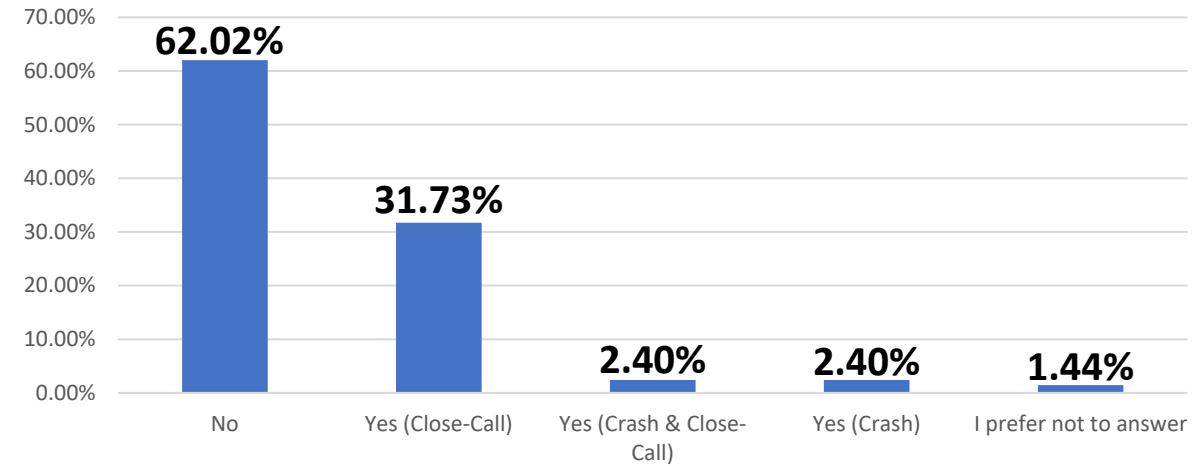
Near-Misses in Washoe County

Washoe ATP

Survey
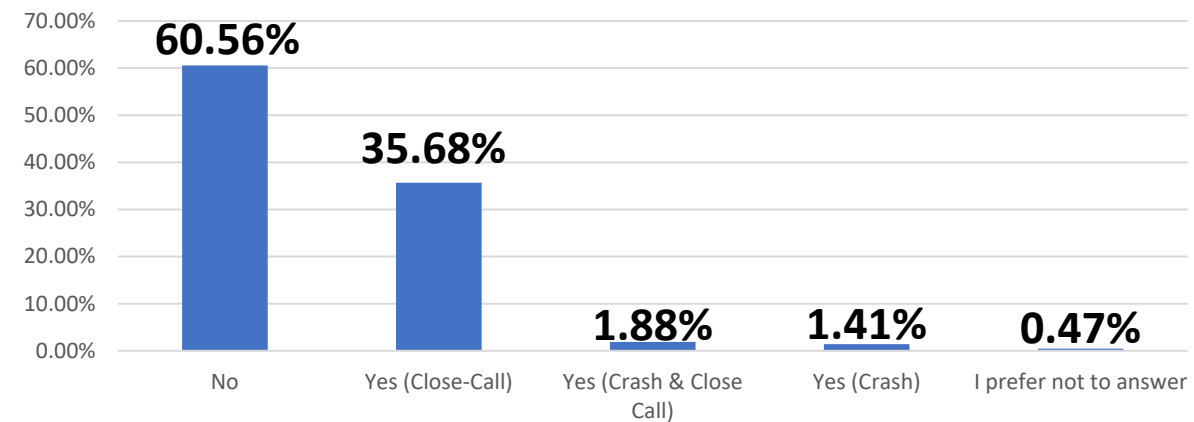
- Have you had a crash or near-miss in the last year?

Bicycling – ~6.5x more close calls than crashes

Walking - ~10.5x more close calls than crashes

Crashes / near misses (within the last year) Bicycling

No	Yes (Close-Call)	Yes (Crash & Close-Call)	Yes (Crash)	I prefer not to answer
62.02%	31.73%	2.40%	2.40%	1.44%

Crashes / near misses (within the last year) Walking

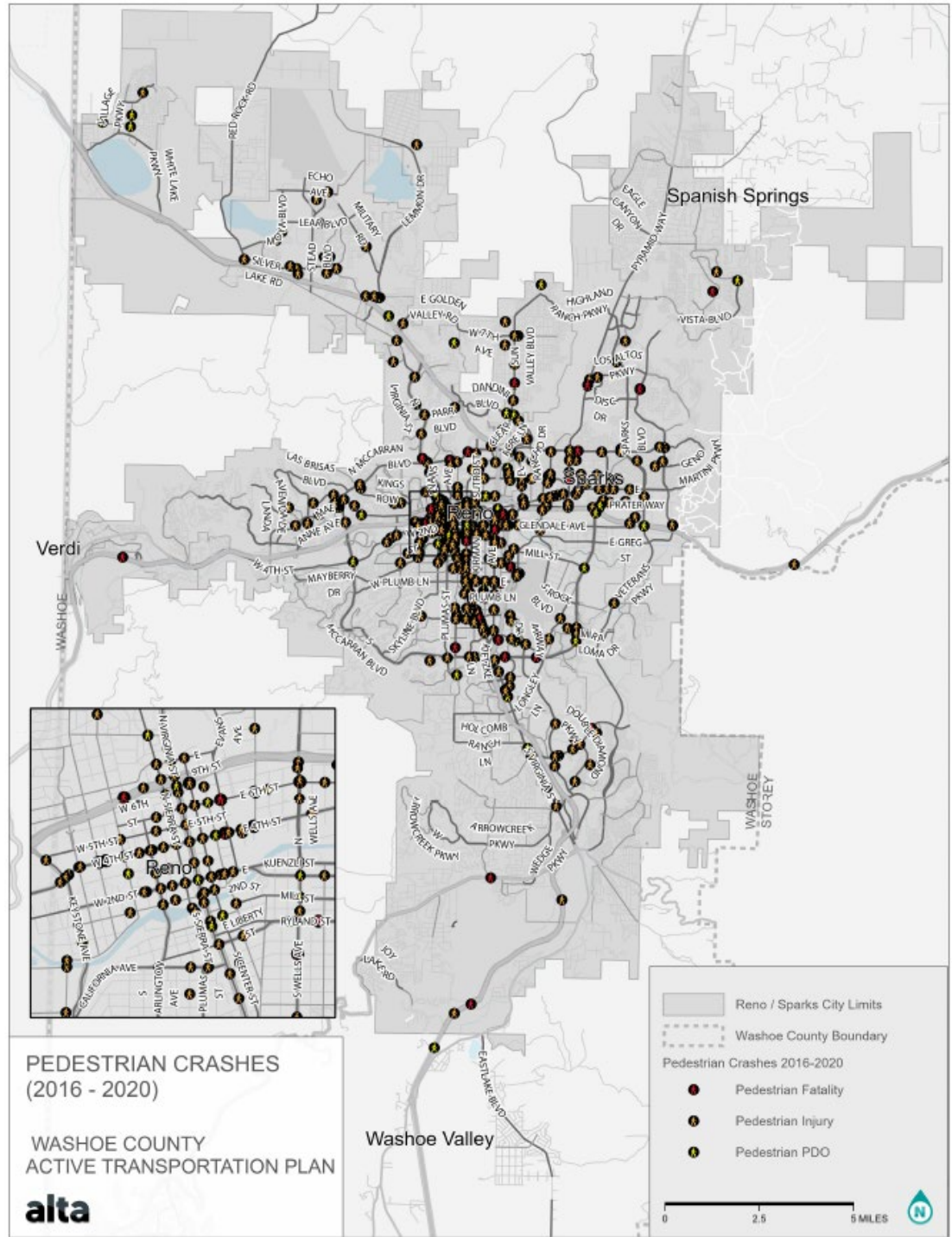| No	Yes (Close-Call)	Yes (Crash & Close Call)	Yes (Crash)	I prefer not to answer
60.56%	35.68%	1.88%	1.41%	0.47%

Washoe County Example

Washoe ATP

Survey

- Have you had a crash or near-miss in the last year?

Bicycling – ~6.5x more close calls than crashes

Walking - ~10.5x more close calls than crashes

PEDESTRIAN CRASHES
(2016 - 2020)

WASHOE COUNTY
ACTIVE TRANSPORTATION PLAN

alta

Reno / Sparks City Limits
Washoe County Boundary
Pedestrian Crashes 2016-2020
- Pedestrian Fatality
- Pedestrian Injury
- Pedestrian PDO

Data-Driven Pedestrian & Bicycle Safety

'Near-Miss' – When there is nearly a crash between a vehicle and a bicyclist or pedestrian.

Often unreported but an important indication of safety issues.

- Past attempts to collect this data have relied on volunteered reports (such as https://bikemaps.org/). These approaches also suffer from low reporting

What we're often looking for in public comments: "Where do you FEEL unsafe or have you FELT unsafe?"

Evaluating types and locations of near-misses can help agencies proactively address safety from a data-driven perspective.

Data-Driven Pedestrian & Bicycle Safety

Crash Modification Factors – proportion of <u>crashes</u> that would be expected after implementing a countermeasure.

Guide funding and selection of countermeasures

Expanding data for greater context & understanding

The Study

Survey

Online survey for Washoe County

August 11 – September 12

Advertised on Facebook & Instagram & from agency partners

Map locations where you have had a near-miss & where you have felt safe
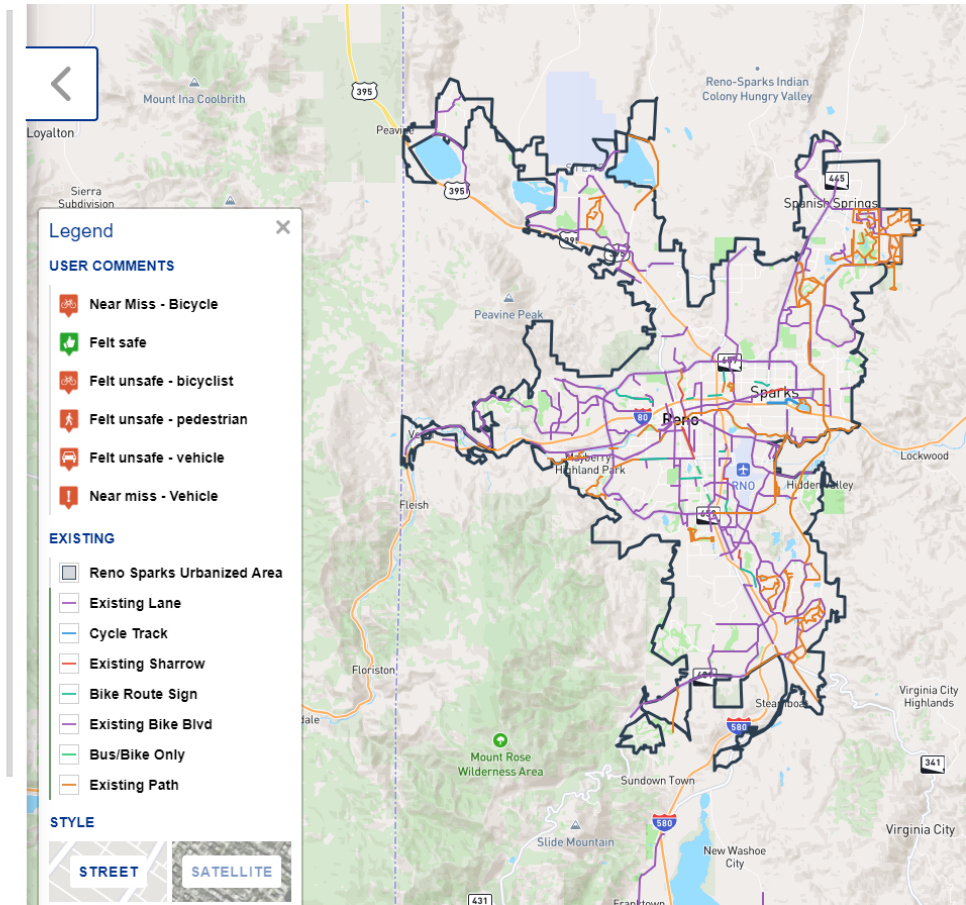
www.RenoSparksNearMiss.com

Geographic Information - SAFE

In this portion of the survey you will be asked to identify different areas where you either felt safe or unsafe based on the modes you use. Please follow the instructions below to complete the first mapping step. Please use the button below to identify approximate locations within Washoe County where you have personally felt safe when traveling as a bicyclist or pedestrian. **Identify no more than ten (10) locations** in this step. Remember that in the context of this study, "safe" or "unsafe" refers to your perceived risk of being involved in a collision with a motorized vehicle while biking or walking. Think about places where you have personally experienced feeling **safe** in this context while traveling as a bicyclist or pedestrian. You will be prompted to complete additional steps based on your answers to the initial survey.

You may either move a marker over an interactive map to indicate locations where you feel safe in the city or enter information in a text box that includes closest major cross streets, or a landmark by clicking **here**

I felt safe here...

When you are done adding locations, click next step.

Legend ✕

USER COMMENTS

- Near Miss - Bicycle
- Felt safe
- Felt unsafe - bicyclist
- Felt unsafe - pedestrian
- Felt unsafe - vehicle
- Near miss - Vehicle

EXISTING

- Reno Sparks Urbanized Area
- Existing Lane
- Cycle Track
- Existing Sharrow
- Bike Route Sign
- Existing Bike Blvd
- Bus/Bike Only
- Existing Path

STYLE

STREET   SATELLITE

alta

Survey

Compare survey identified locations with locations identified from crash mapping

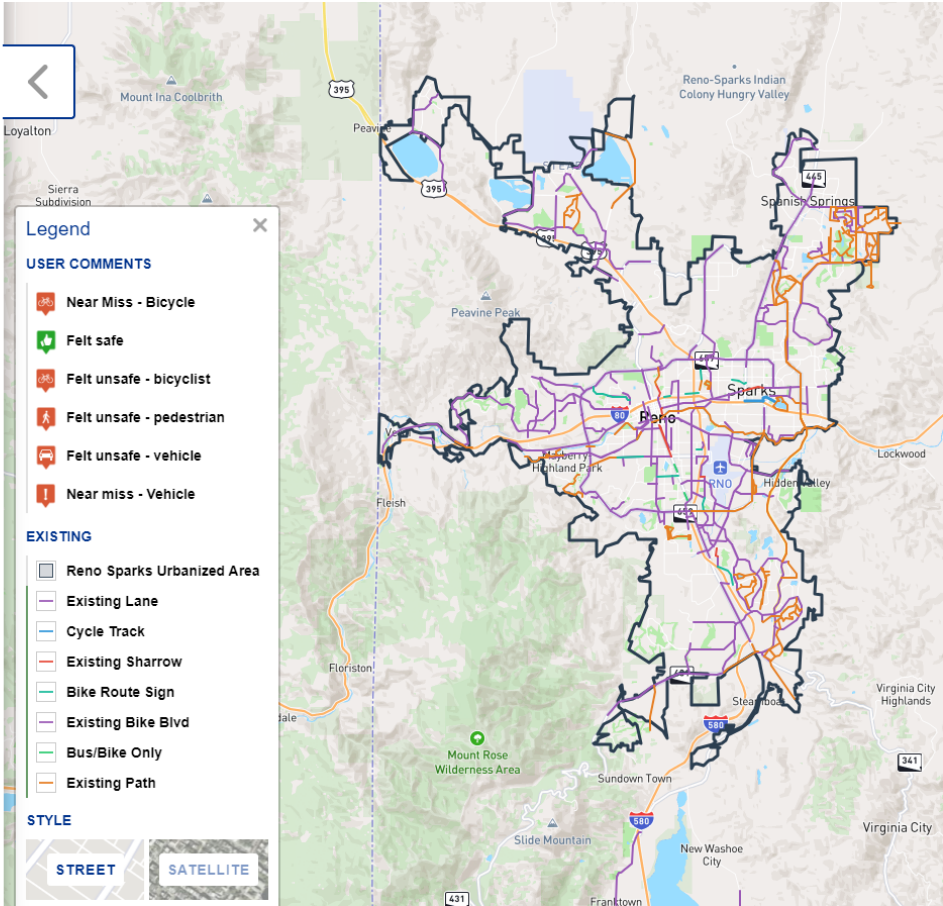Evaluate up to 10 locations for multiple days

Geographic Information - SAFE

In this portion of the survey you will be asked to identify different areas where you either felt safe or unsafe based on the modes you use. Please follow the instructions below to complete the first mapping step. Please use the button below to identify approximate locations within Washoe County where you have personally felt safe when traveling as a bicyclist or pedestrian. **Identify no more than ten (10) locations** in this step. Remember that in the context of this study, "safe" or "unsafe" refers to your perceived risk of being involved in a collision with a motorized vehicle while biking or walking. Think about places where you have personally experienced feeling **safe** in this context while traveling as a bicyclist or pedestrian. You will be prompted to complete additional steps based on your answers to the initial survey.

You may either move a marker over an interactive map to indicate locations where you feel safe in the city or enter information in a text box that includes closest major cross streets, or a landmark by clicking here

I felt safe here...

When you are done adding locations, click next step

Legend

USER COMMENTS

- Near Miss - Bicycle
- Felt safe
- Felt unsafe - bicyclist
- Felt unsafe - pedestrian
- Felt unsafe - vehicle
- Near miss - Vehicle

EXISTING

- Reno Sparks Urbanized Area
- Existing Lane
- Cycle Track
- Existing Sharrow
- Bike Route Sign
- Existing Bike Blvd
- Bus/Bike Only
- Existing Path

STYLE

STREET   SATELLITE

alta

New Technology Driving Bicycle & Pedestrian Safety Data

Mobile LiDAR Data Collection Algorithms

developed by University of Nevada, Reno

Evaluates 'Near-Misses' at an intersection

- Frequency and type of 'Near-Misses'

- Location within the intersection

- Contributing factors (i.e. speed)

Mobile LiDAR unit. Credit: Hao Xu, Associate Professor, CEE, UNR

alta

Near-Miss Focus Group

Local Washoe County Residents who walk & bike

Help define the thresholds of a 'Near-Miss'

alta

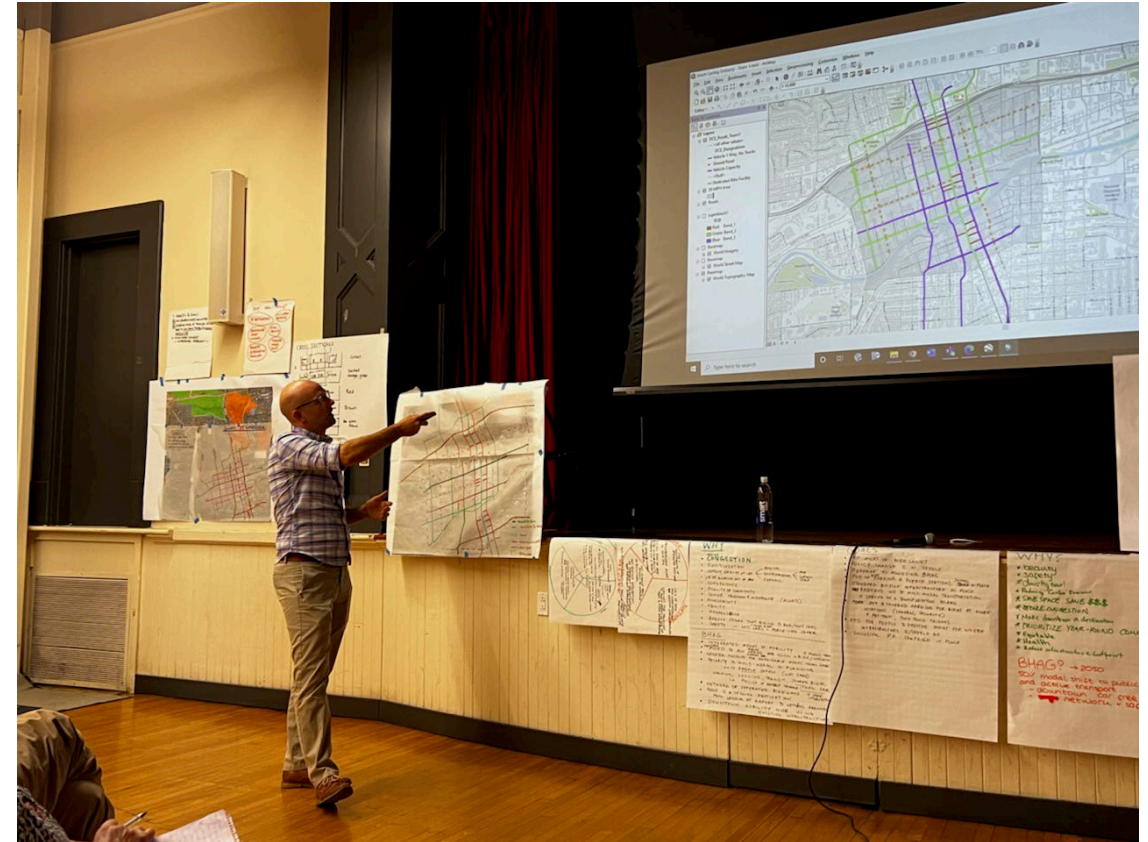# Geo-Design Workshop

Community-wide Workshop

Fall 2023

<u>Goals</u>

Identify a broad set of locations in Truckee Meadows for long-term monitoring

Identify a selection of potential temporary countermeasures local agencies are comfortable testing

Next Steps

Phase 2 of research

Build off of Geo-Design Workshop

Longer-term monitoring and evaluation of select countermeasures with changes to near-misses at select locations

thank you!