



## Broome & Tioga Safety Action Plan

December 16, 2024

Project Steering Committee #1  
Kick-Off

**BMTS**



# Agenda

1. Introductions
2. Process Overview
3. Crash Analysis & Discussion
4. Equity Assessment
5. Next Steps



# Today's Speakers

## **BMTS**

- Jennifer Yonkoski

## **WSP (Consultant)**

- Joel Anders
- Han Bao
- Greg Benoit

## **EDR (Outreach)**

- Brianna Eassa

## **Barton & Loguidice (Engineering / Projects)**

- Mark Budosh
- Alex Kerr



## Process Overview



# SS4A Connects Vision Zero, Equity + Climate Goals

Funded through the Bi-Partisan Infrastructure Bill

- Final round in 2026, upcoming chance in 2025

3 separate funding programs to fund Vision Zero:

- Comprehensive Safety Action Plans → Current Study
- Supplemental Planning → BMTS or Municipalities
- Implementation → Mostly Municipalities

USDOT also focusing on secondary benefits:

## **Equity**

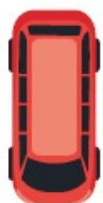
- Disadvantaged communities overrepresented in fatalities

## **Multimodal Mobility**

- Lack of adequate pedestrian and bike facilities

## **Climate Change**

- Investment in safe non-motorized infrastructure helps encourage mode shift, reducing VMT (crash exposure)



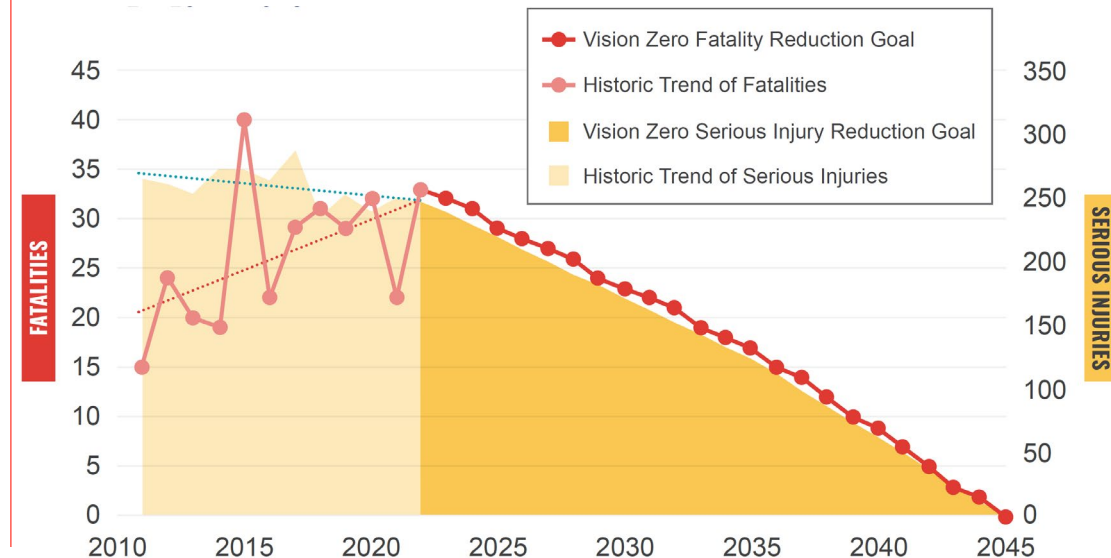
**BMTS**

**wsp**

# Study Outcomes

- Shared Values & Goals
- Projects
- Prioritization of Projects
- Strategies for Implementation
- Program for Monitoring Performance

## —Public Commitment to Vision Zero





# Our Project Team

- BMTS Staff
  - Leads planning process*
  - Manages consultants*
  - Adopts / Owns Safety Action Plan*  
(Planning and Policy Committee)
  - Partners with Jurisdiction*
    - County and municipal staff (own roads)
    - Coordination with NYSDOT where applicable
    - Engaging with EMS / 1<sup>st</sup> responders
- Project Steering Committee
  - Informs planning process with local knowledge*
  - Works through detail with team*
- Consultant Team
  - Supports planning process*
  - Performs technical analysis*
- The Public
  - Shares lived experiences*
  - Offers a “reality check”*



## Detailed Crash Analysis

# Crash Data Analysis

## Summary of Analytical Approach

- Data Reviewed
  - Primary Source = NYSDOT*
    - Crash Location & Engineering Analysis Repository (CLEAR)
    - # Crashes
  - Secondary Source = Univ. of Albany – Rockefeller College*
    - Institute for Traffic Safety Management & Research (ITSMR) – Traffic Safety Statistical Repository (TSSR)
    - # Persons
- Analysis allows for variety of results
  - Region-wide trends*
    - Disregards artificial lines
  - County-level networks*
    - Historical locations with high concentrations of injuries
    - Areas of estimated risk based on various factors
  - Town-level rankings*
  - Mode-specific orientation*
    - As desired

# Crash Data Analysis Order of Presentation

- 5-year summary at county-Level
  - All Injuries*
  - Fatal + Serious Injury*
- Crash location maps
  - Fatal & Serious Injury*
  - All Injury Crashes for Walking and Biking*
    - Pedestrian-involved
    - Bicyclist-involved
- Factors and trends at county-level
  - Time of Day*
  - Lighting*
  - Weather*
  - Roadway Condition*
  - Location*
    - Intersection Control
    - Roadway Geometry
  - Crash Type*
    - Manner of Collision
  - Contributing Actions*

# Crash Data Analysis

## Overview of Injury Severity & Terms

### —Severity Levels

- What level of injury did the crash cause?*
- How bad is the injury?
- Weighting for High Injury Network*

### —“KSI”

- Killed OR Seriously Injured*
  - K + A in table below
- Vulnerable Road User
  - Walking or biking*

| Severity Letter | Injury Level              | Description of Outcome                                                                                                                                                                                                |
|-----------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K               | Fatal                     | Killed (death within 30 days following injury from a crash)                                                                                                                                                           |
| A (SI)          | Serious                   | Severe lacerations, broken or distorted limbs, crushed chest, internal injuries, unconsciousness when taken from the crash scene, or unable to leave crash scene without assistance, severe lacerations, severe burns |
| B               | Suspected (“Non-Serious”) | Lumps on head abrasions, and minor lacerations                                                                                                                                                                        |
| C               | Possible                  | Momentary unconsciousness, limping, complaint of pain with no visible injury                                                                                                                                          |
| O               | None (Property Damage)    | Uninjured                                                                                                                                                                                                             |



# Crash Data Analysis County Comparison

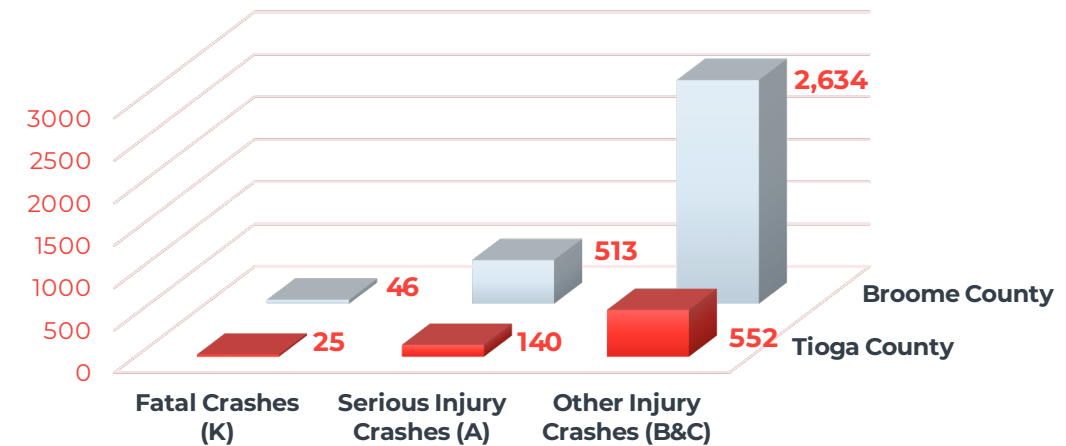
## Crash Data Universe

- All Injury Crashes (3,910)
  - *Non-Limited Access Roadways*
  - *Between January 2019 and December 2023*
- Majority located in Broome
  - *Nearly 4 in 5 (82% or 3,193)*
- Typical crashes in Tioga slightly more severe

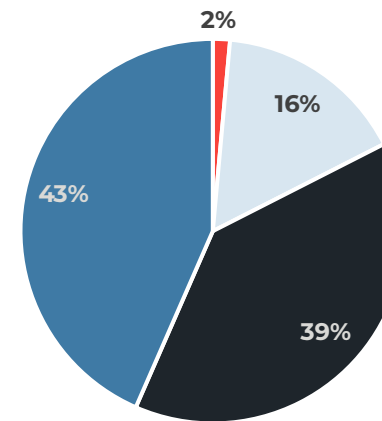
## Combined Distribution

- Nearly 1-in-5 fatal or serious
  - *Fatal: 2%*
  - *Serious Injury: 17%*

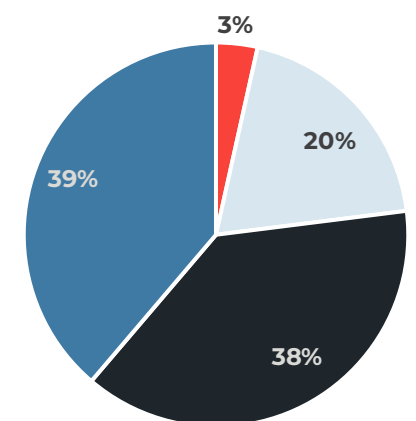
## Injury Crashes (KABC) by County



### Broome County



### Tioga County



■ Fatal Crashes (K) ■ Serious Injury Crashes (A)  
■ Suspected Injury Crashes (B) ■ Possible Injury Crashes (C)

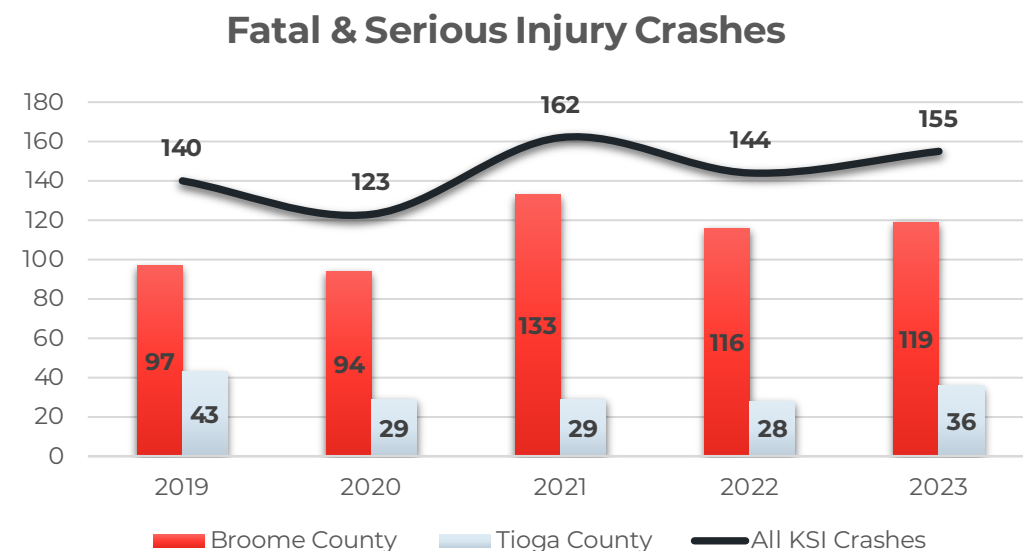
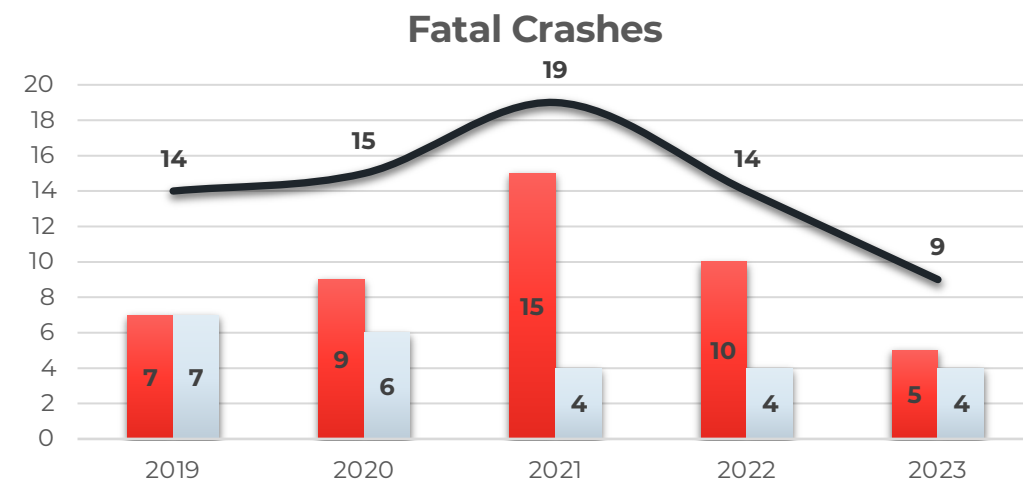
# Crash Data Analysis – Fatal & Serious Injury Year over Year Trend (2019 – 2023)

- Taking the **724 Fatal (K)** or **Serious Injury (SI)** Crashes
  - 10% Fatal
  - 90% Serious Injury

- 11% growth (2023 vs. 2019)

- Tioga Co. (23% of KSI)
  - 35% of two-county fatalities
  - 15% of county-level KSI crashes

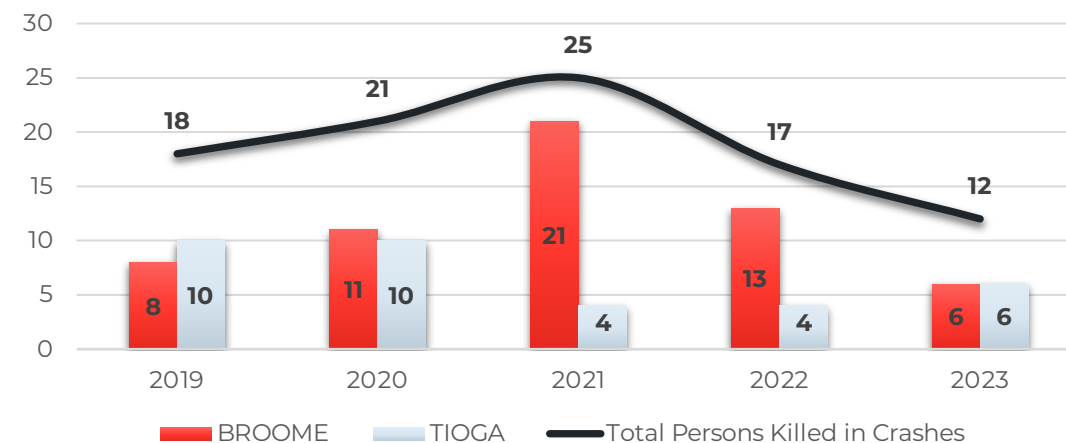
- Broome Co. (77% of KSI)
  - Comparatively less fatal
  - 8% of county-level KSI crashes



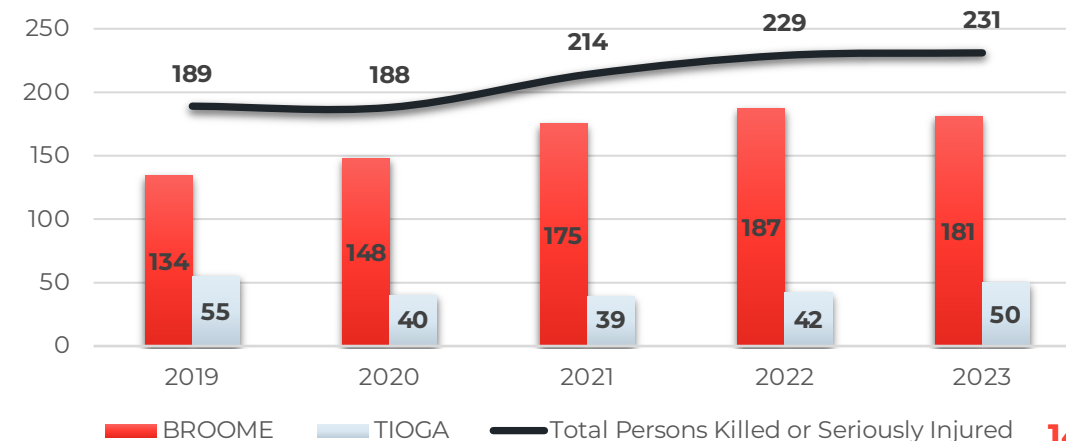
# Crash Data Analysis – Persons Killed & Seriously Injured (2019 – 2023)

- 958 Persons (~192 per year) Killed (K) or Seriously Injured
  - *Averages to every other day (0.52)*
  - *22% increase between 2023 & 2019*
- TSSR\* allows us to investigate person-level data
  - *# Persons Impacted  $\geq$  # Crashes*
  - *$\sim 1.30 \times$  for Crashes  $\rightarrow$  Persons (K + SI)*
- Caveats to using this data
  - *Includes many cases that get screened from CLEAR (interstate)*
  - *Does not specify facility or crash location*

Number of People Killed in Fatal Crashes



Number of People Killed or Seriously Injured in KSI Crashes



\* New York State Traffic Safety Statistical Repository (TSSR)

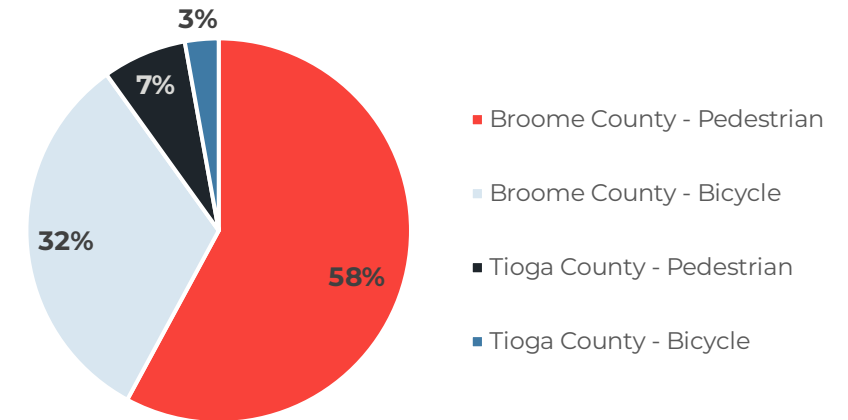


# Crash Data Analysis

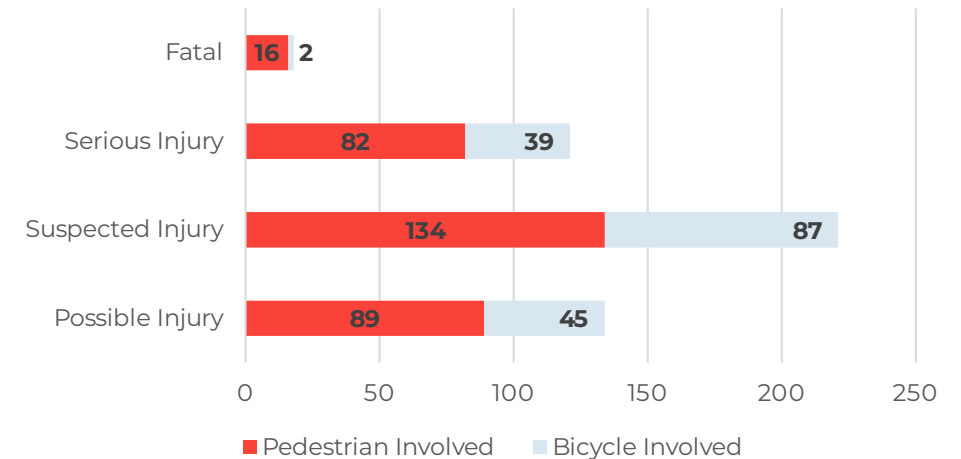
## Vulnerable Road Users

- 13% of injury crashes involved someone walking or biking
  - Pedestrian common (65%)*
- 90% of these occurred in Broome County
- Of all VRU injury crashes, 28% caused death or serious injury
  - 31% for pedestrians*
  - 24% for bicyclists*

VRU Crashes by User Type and County



VRU Crashes by Severity





# Crash Mapping

## Order of Presentation

- Fatal (K) & Serious Injury (SI) Crashes
  - Regardless of mode of travel*
- All Injury Crashes for Walking and Biking (VRUs)
  - Pedestrian-involved*
  - Bicyclist-involved*

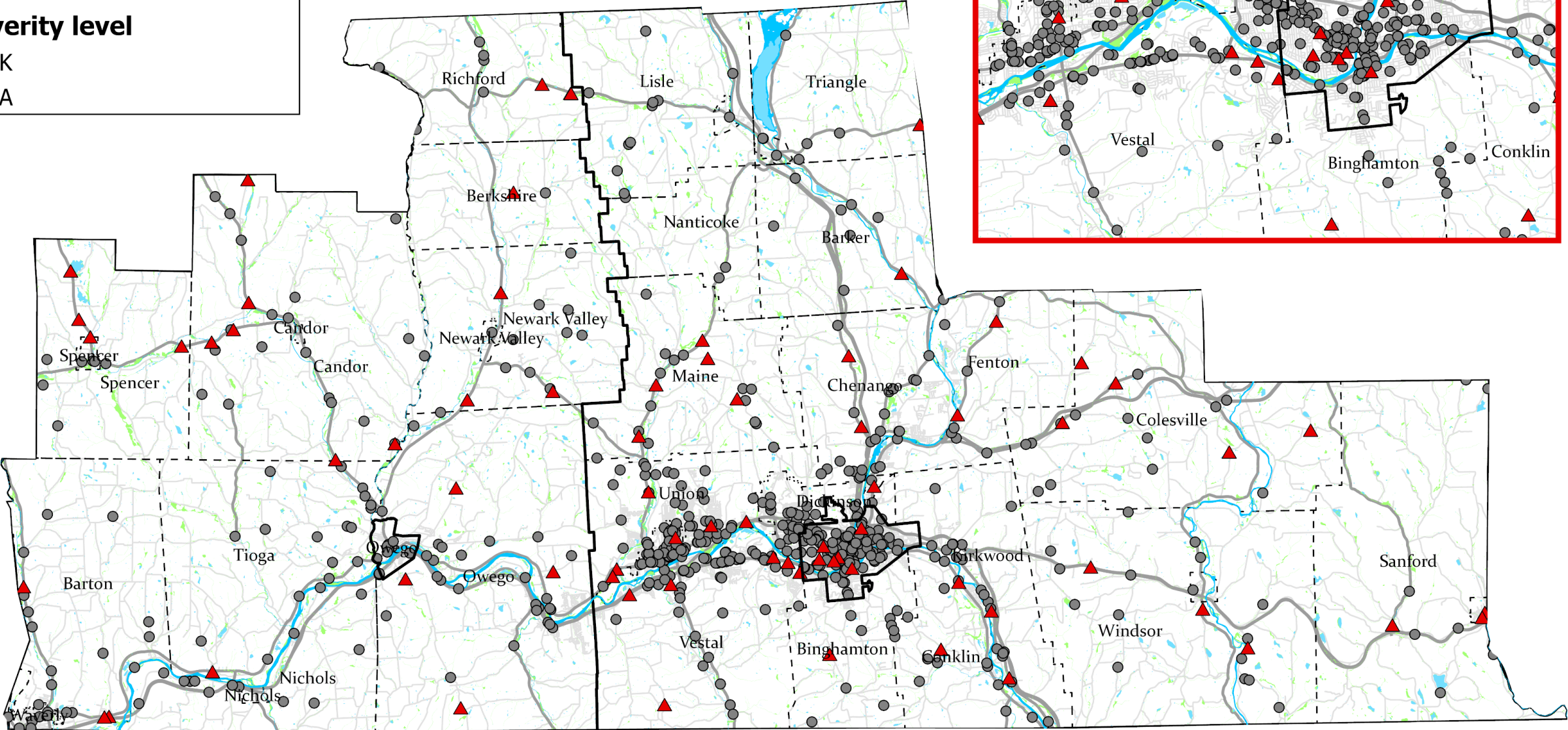


# All Modes – Fatal (K) & Serious Injury (A) Crashes (2019-23)

## All Vehicle KSI Crashes

### Severity level

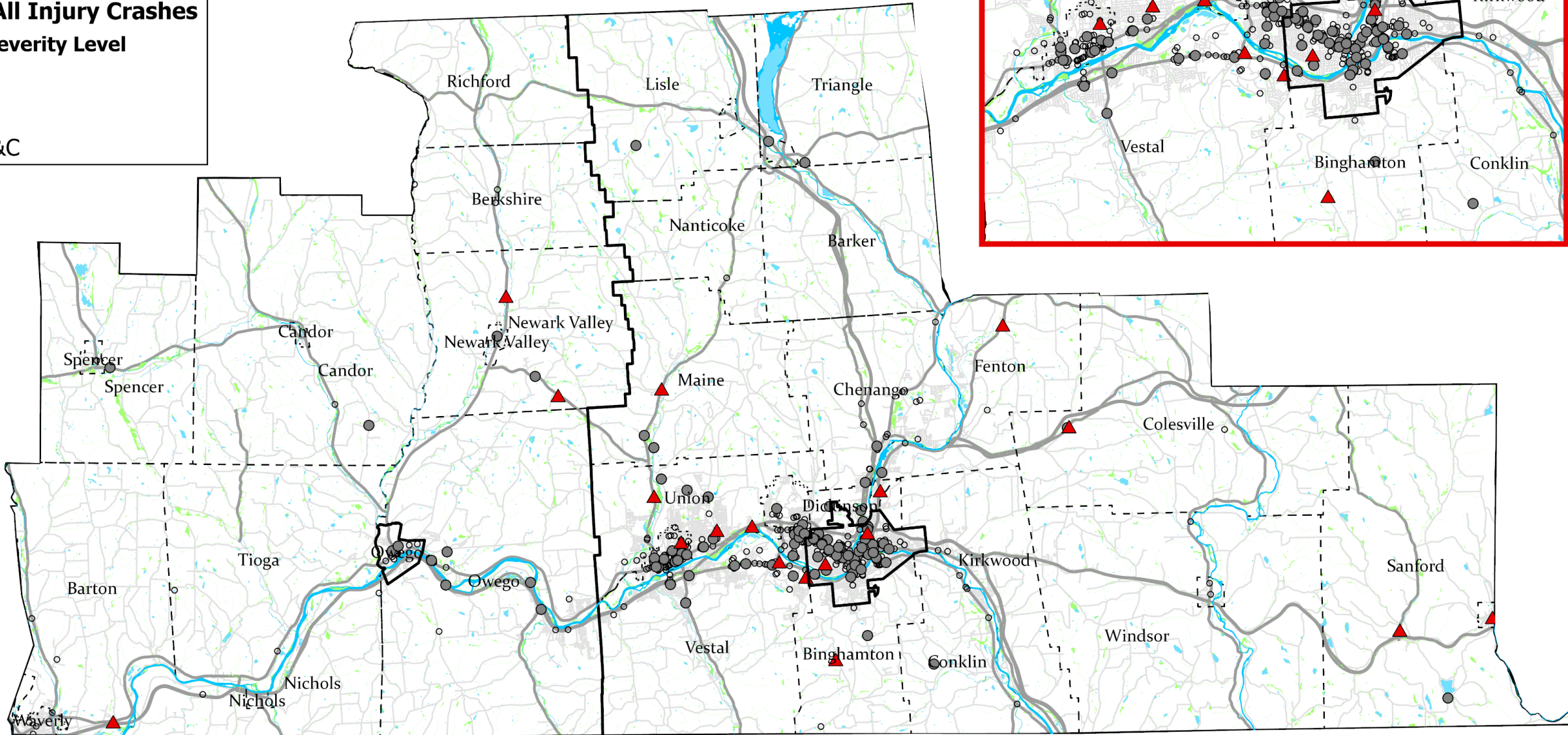
- ▲ K
- A



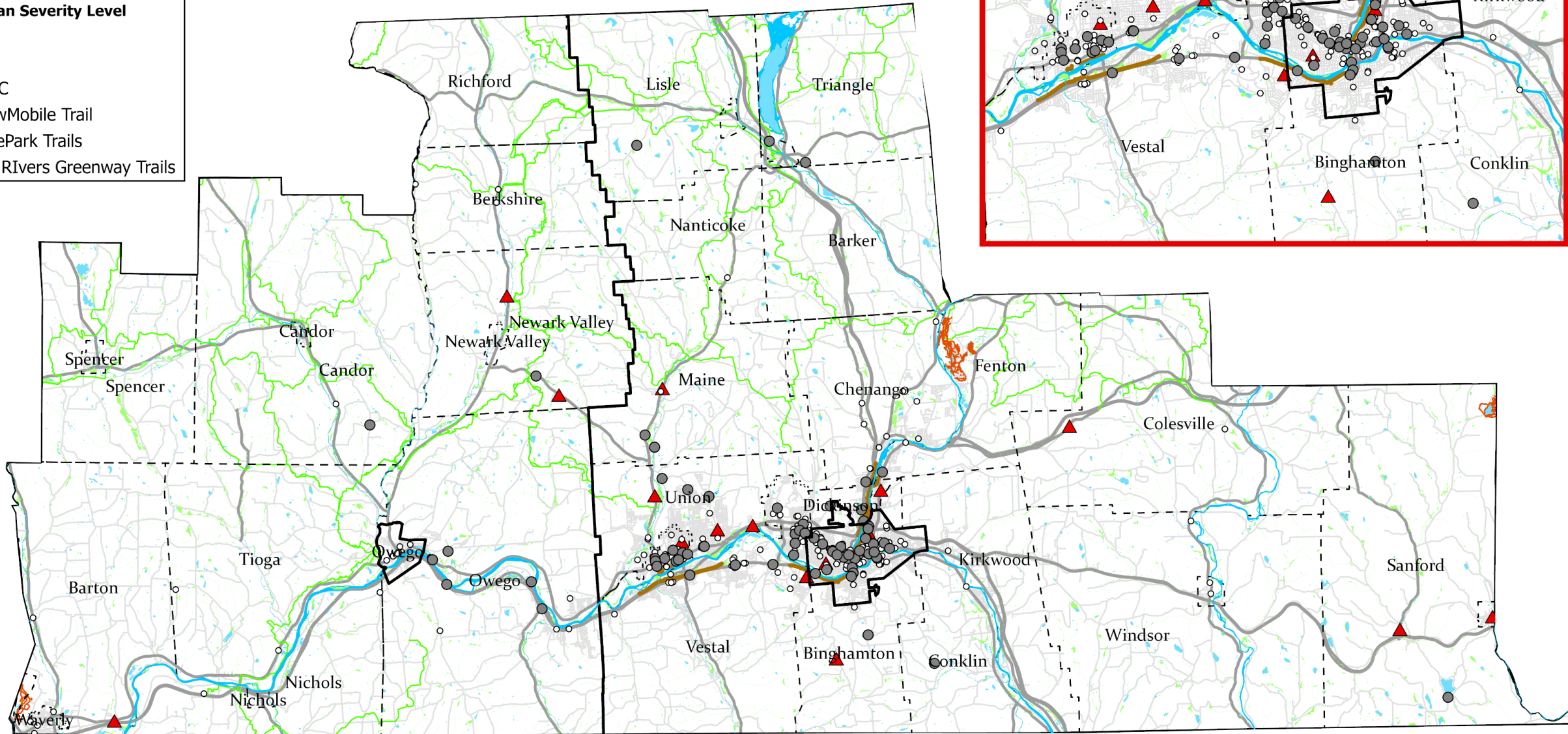
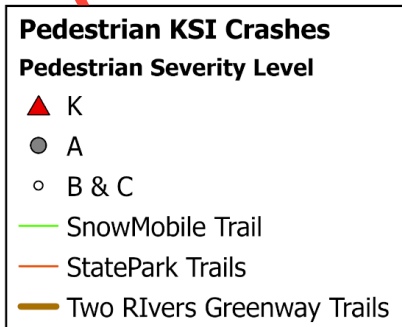
# Walking & Biking – All Injury Crashes (2019-23)

## VRU All Injury Crashes VRU Severity Level

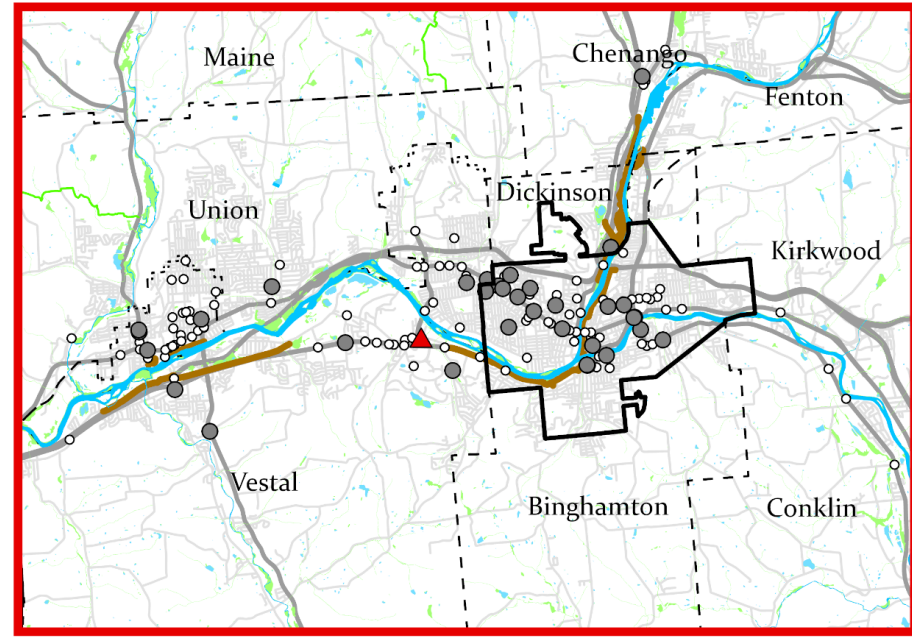
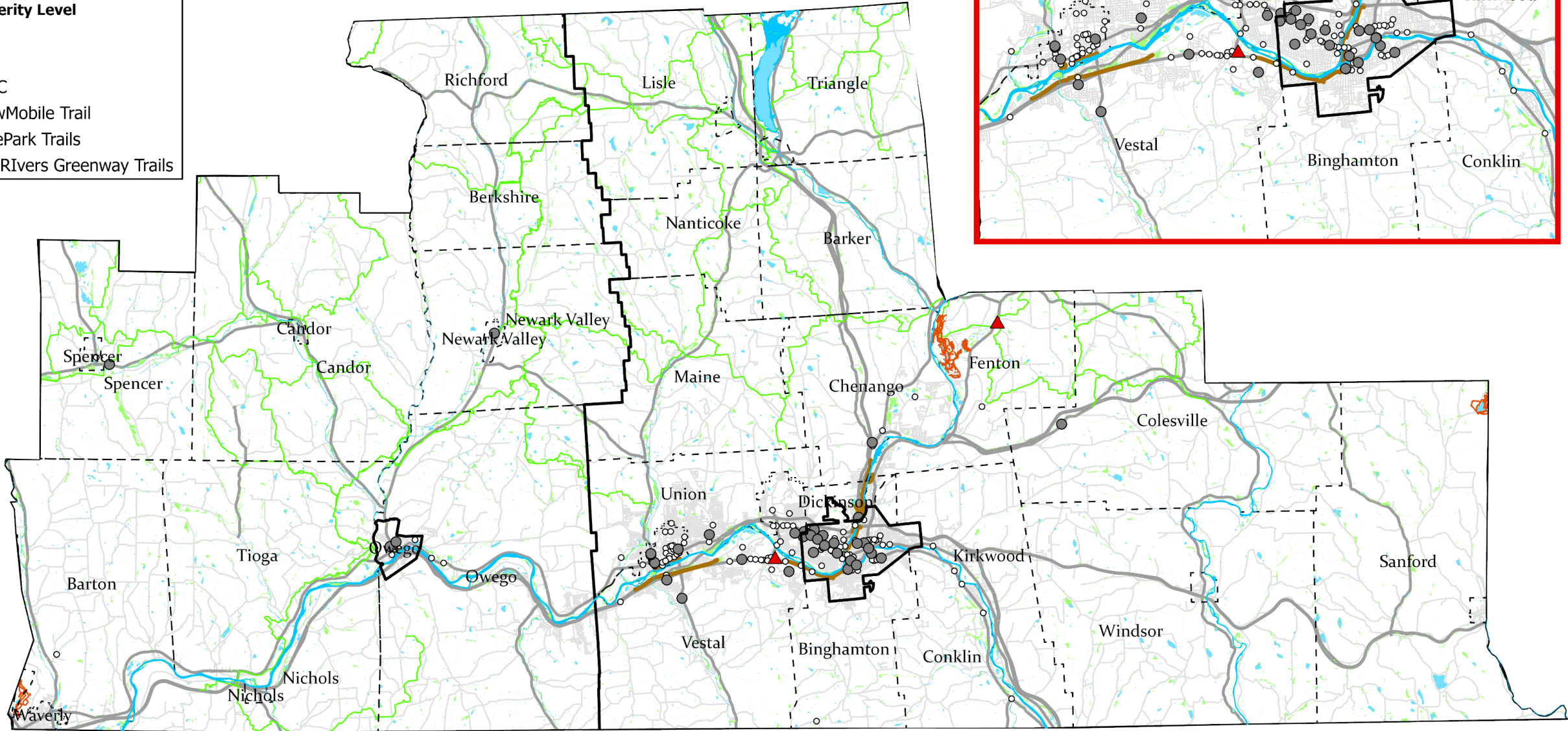
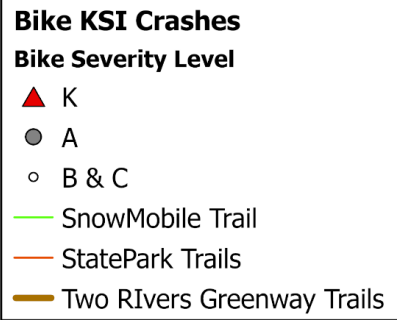
- ▲ K
- A
- B&C



# Pedestrian – All Injury Crashes (2019-23)



# Bicyclist – All Injury Crashes (2019-23)





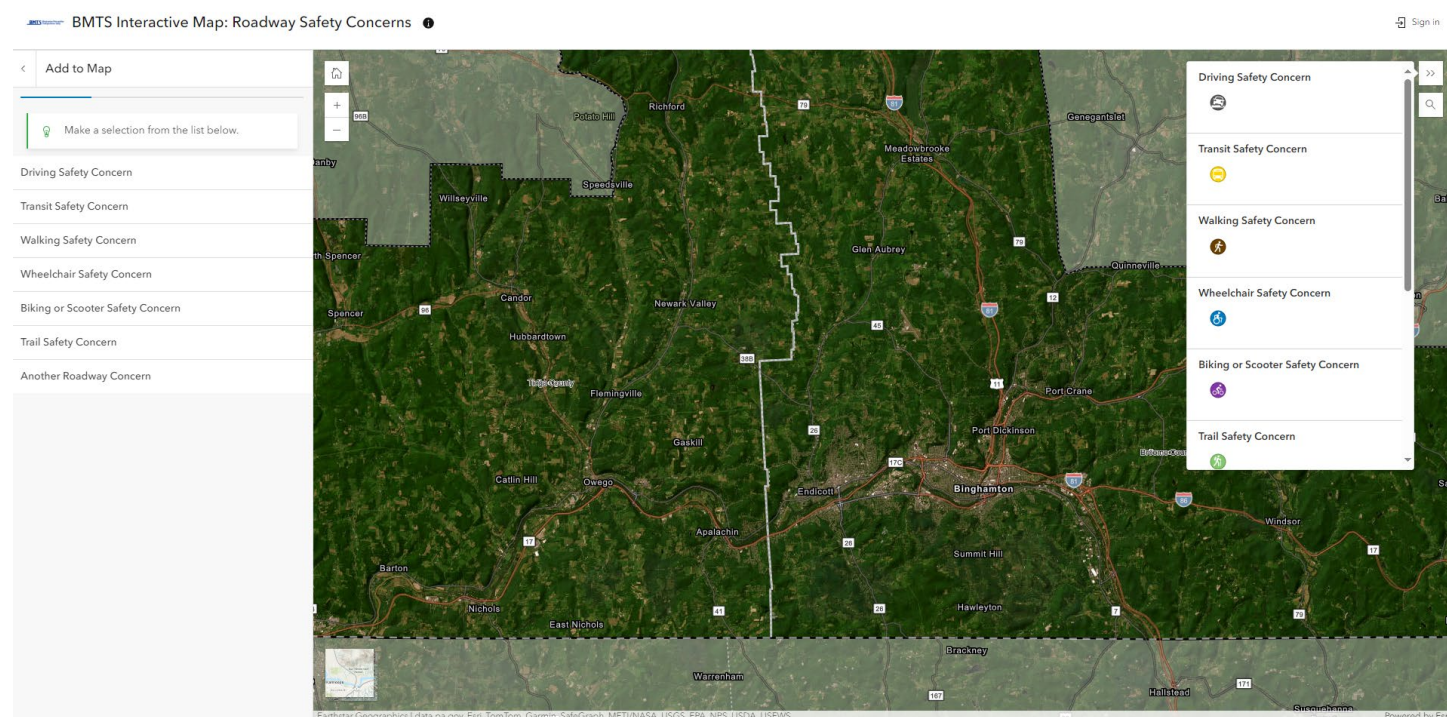
# Crash Mapping Interactive Concerns Map

- Allows users to note their concerns
  - *Driving, walking, biking, transit, wheelchair, trail, other*

- Could be used to ground truth the technical data shown

- Open through first half of the project

## BMTS Interactive Map Roadway Safety Concerns



# Crash Discussion – Food for Thought

## *High Crash Locations (From Proposal)*

### BROOME



Binghamton

- Main St between Laurel Ave & Cedar St
- Main St/Edwards St
- Main St/Murray St
- Leroy St/Walnut St
- Court St/Washington St
- N. Shore Dr/Vestal Pkwy East Ramp
- NYS Route 434/S. Washington St
- Brandywine Ave/Court St



Endicott

- S. Loder Ave/NYS Route 17C
- N. Nanticoke Ave/Jennings St
- Monroe St/McKinley Ave

Vestal

- NYS Route 26, south of Meeker Road
- NYS Route 434/Rano Blvd
- NYS Route 434/Bunn Hill Road

Johnson City

- Harry L Drive/Reynolds Road

Chenago

- Front St/Castle Creek Road

### TIOGA

[None]

[None]

# Crash Discussion – Food for Thought

## *Area Statistics (From Proposal)*

### BROOME COUNTY

### TIOGA COUNTY

2020 Census Population

198,683

48,455

2020 Median Income  
(Household / Family)

\$35,347 / \$45,422

\$40,266 / \$46,509

Square Miles

715

523

Number of Towns

16

9

Larger Populated Areas

Binghamton (county seat), Johnson City and Endicott make up the “Triple Cities.” Other population centers in Endwell, Chenango Bridge, Deposit and Port Dickinson.

Villages of Owego (county seat), Newark Valley, Nichols, Spencer, and Waverly, along with the Census designated place of Apalachin.

Notable Federal Facilities

Interstates 81, 86 and 88

Interstate I-86/17, US-220

Notable NY State Roadways

19 routes

17C, 38, 96 and 96B

County Road System

343 centerline miles of road, along with 105 bridges and 150 large culverts

143 centerline miles of road across 32 county routes

# Crash Discussion Issues & Anecdotes OR Location-Based

## PROMPTS

- What is the issue?
- What do you think causes it?
- Where do you see it most (e.g., facility?)
- When do you see it occur most frequently?
- What do you think could be done?
- Why does it matter to you?

## POTENTIAL CATEGORIES

- Geometric / Design
- Operations
- Behavioral hotspots
- Multimodal clusters
- Regional pinch points
- Time-of-Day / -Year
- Maintenance



# Crash Data Analysis Factors Assessed

- Time of Day
  - Lighting
  - Weather
  - Roadway Condition
- Location
    - Intersection Control*
    - Roadway Geometry*
  - Crash Type
    - Manner of Collision*
  - Contributing Actions

# Crash Data Analysis – Fatal & Serious Injury Time of Day and Lighting

## Time of Day

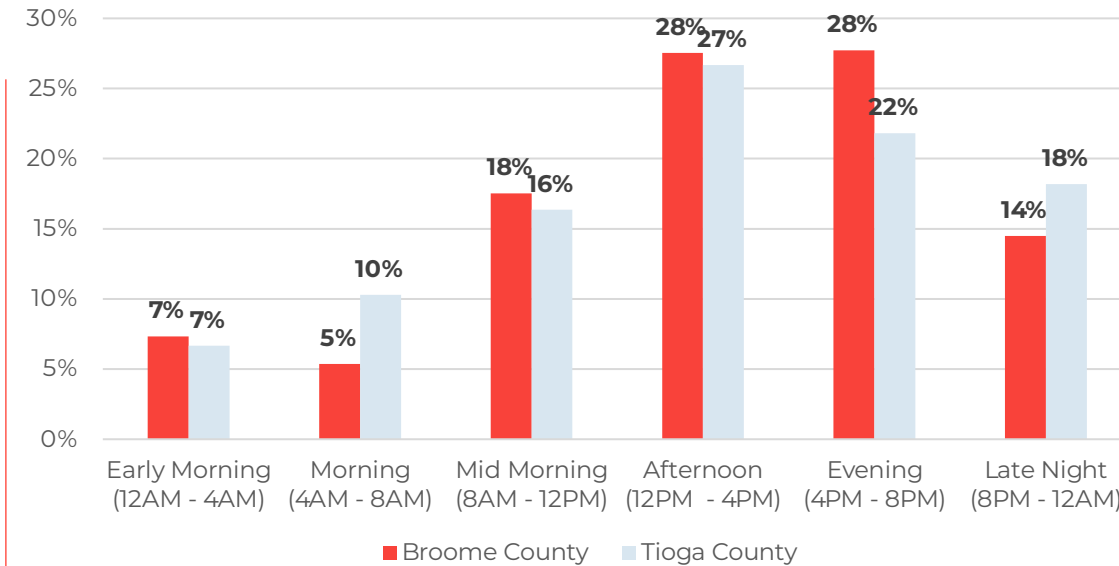
- Afternoon + Evening >50% of KSI crashes
- 2 to 3 PM had highest share
  - 4 to 6 PM
  - 12 to 2 PM

## Light Conditions

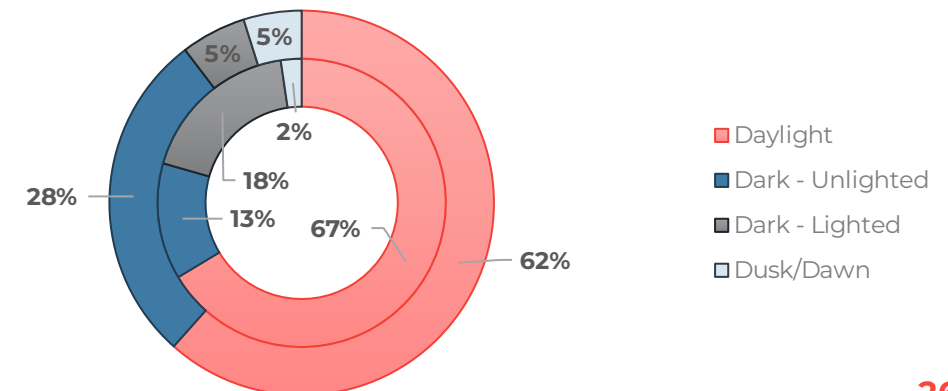
- 2/3 of KSI crashes in daylight
- Dark, unlit more prevalent in Tioga County (28% of KSI)

Outer Ring – Tioga County  
Inner Ring – Broome County

KSI Crashes by Time of Day



KSI Crashes by Light Condition



# Crash Data Analysis – Fatal & Serious Injury Weather and Roadway Condition

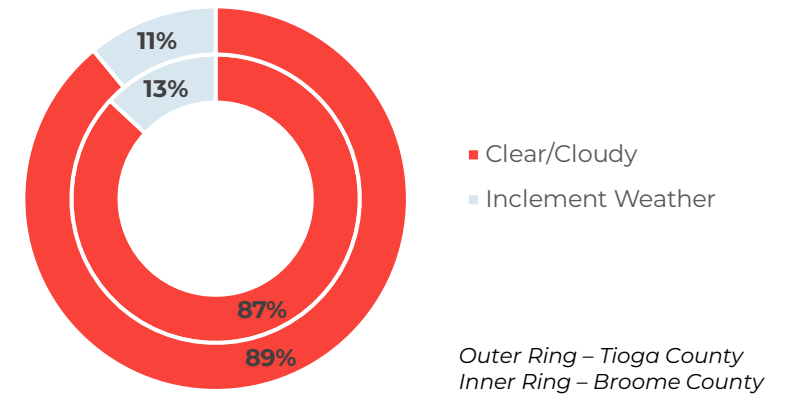
## Weather Conditions

- Majority of KSI crashes in “Clear / Cloudy” weather
- Inclement conditions were not a major contributing factor
  - Snow (4%) & Rain (7%)

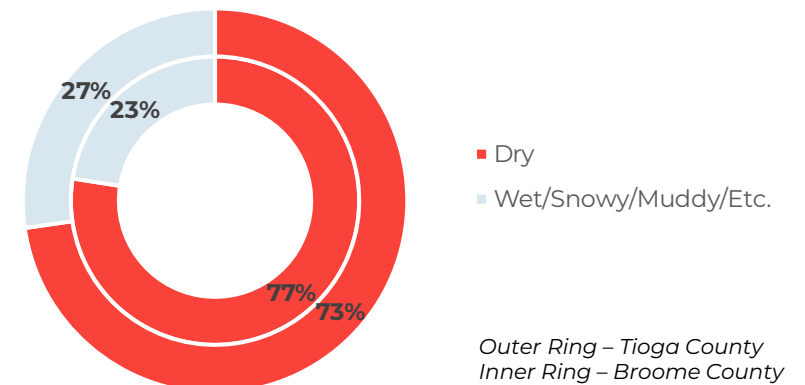
## Roadway Conditions

- Condition of pavement had larger, but limited, influence
  - More pronounced for Tioga
- Approximately three-in-four KSI crashes occurred on “Dry” roads
  - Snowy / Icy (4%)
  - Wet (18%)

KSI Crashes by Weather Condition



KSI Crashes by Roadway Condition



# Crash Data Analysis – Fatal & Serious Injury

## Crash Location and Intersection Control

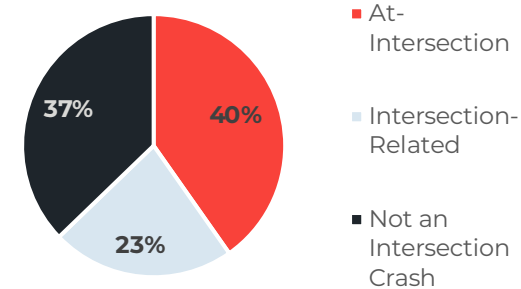
### Crash Location

- Just over half of KSI crashes occurred near an intersection
- Substantial difference among the two counties

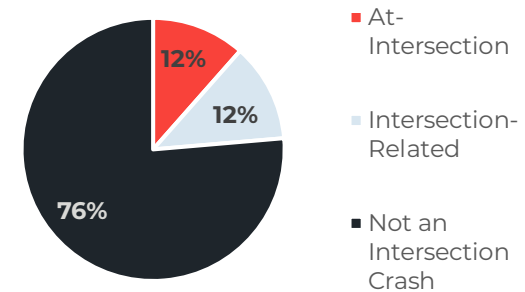
### Intersection Control

- No Control ~30% in both
- Broome County
  - Majority occurred near signal
  - Nearly two-thirds at signal or stop
- Tioga County
  - Nearly half at stop signs
  - Limited signal presence
  - Higher share of “Other Signage”

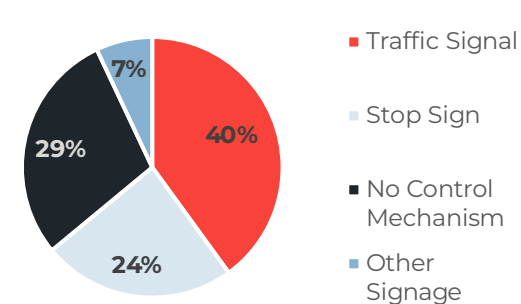
KSI Crashes by Location  
Broome County



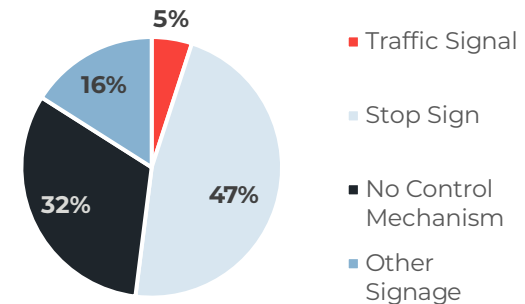
KSI Crashes by Location  
Tioga County



"At-Intersection" by  
Control Mechanism  
Broome County



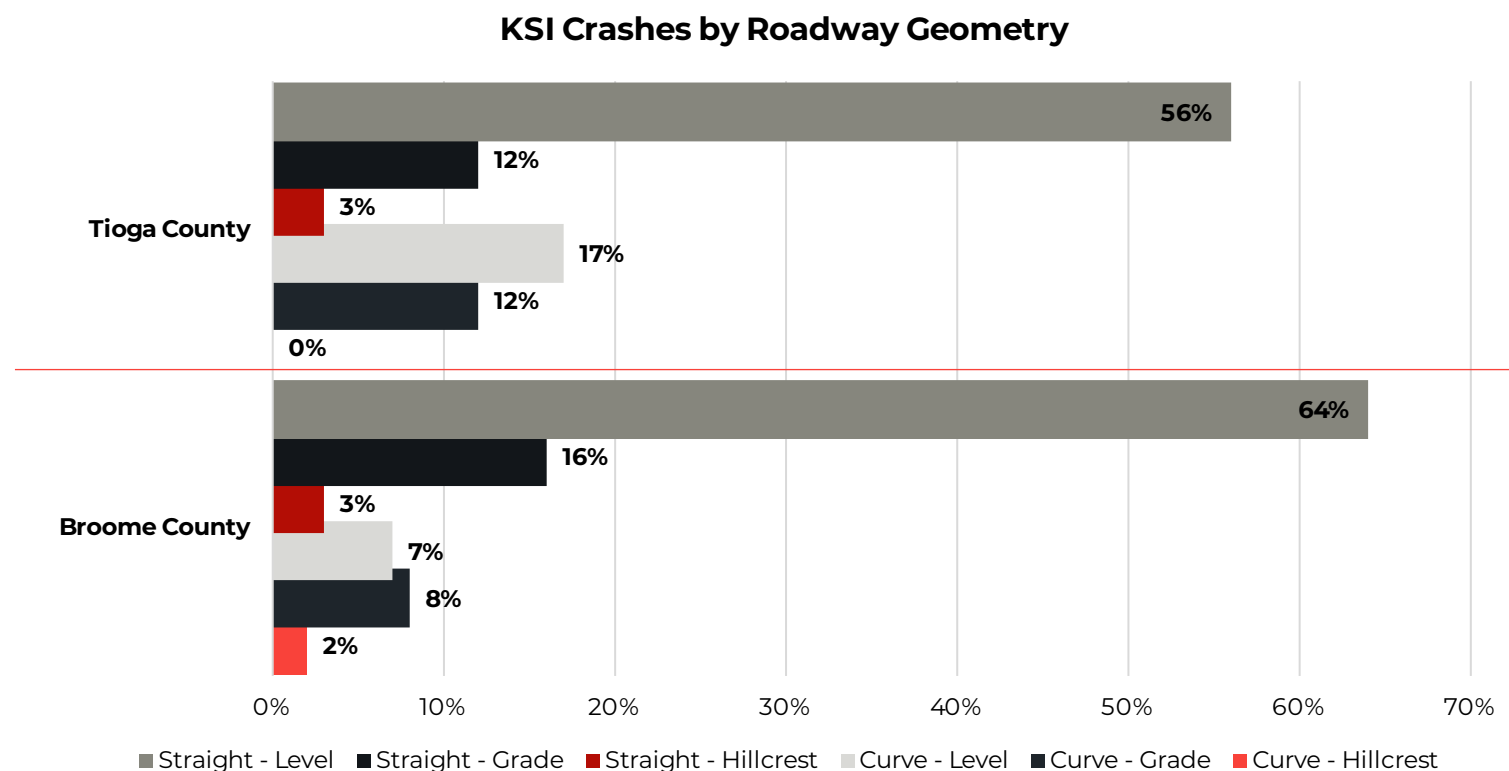
"At-Intersection" by  
Control Mechanism  
Tioga County



# Crash Data Analysis – Fatal & Serious Injury Roadway Geometry/Characteristics

## Roadway Geometry

- Majority of KSI crashes occurred on straight and level roadways
- Crashes at curves are more frequent in Tioga County



# Crash Data Analysis – Fatal & Serious Injury

## Crash Type and Manner of Collision

### CRASH TYPE

- What did the driver strike that led to an injury crash?
  - *Another driver and/or vehicle occupants*
  - *Human walking, biking, or rolling*
  - *Manmade object*
  - *Natural element*
  - *Wildlife*

### MANNER OF COLLISION

- When multiple drivers are involved, how did the vehicles collide?
  - *Same / opposite direction*
  - *Location of impact*
  - *Maneuver performed*

# Crash Data Analysis – Fatal & Serious Injury

## Crash and Collision Types – Broome County

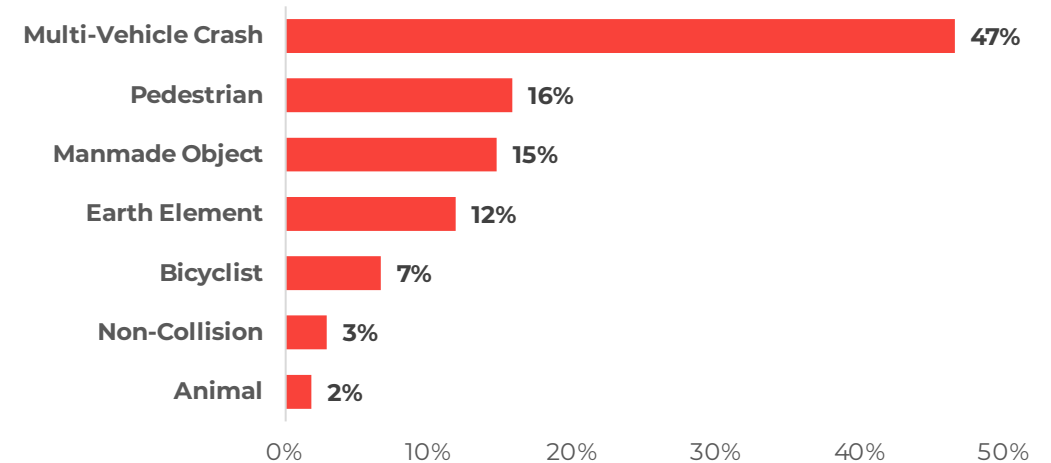
### Crash Type

- Majority of KSI crashes involved two or more vehicles
- Nearly one-in-four KSI crashes involved a person not in a vehicle

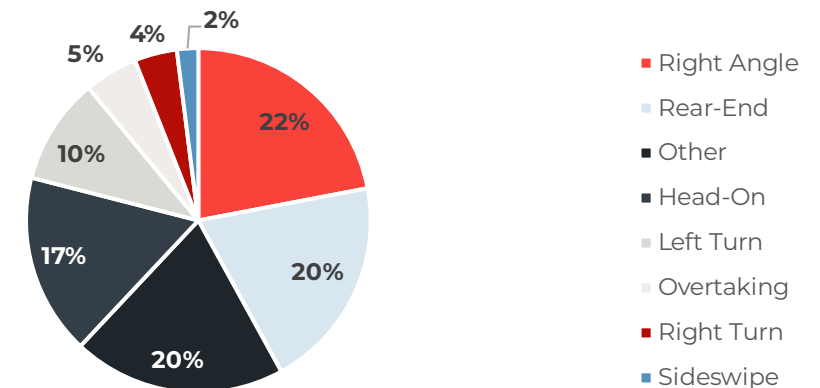
### Manner of Collision

- For multi-vehicle crashes, over 60% of KSIs were related to:
  - *Right Angle (“T-Bone”)*
  - *Rear-End*
  - *Head-On*

KSI Crashes by Crash Type



Manner of Collision for Multi-Vehicle KSI Crashes



# Crash Data Analysis – Fatal & Serious Injury

## Crash and Collision Types – Tioga County

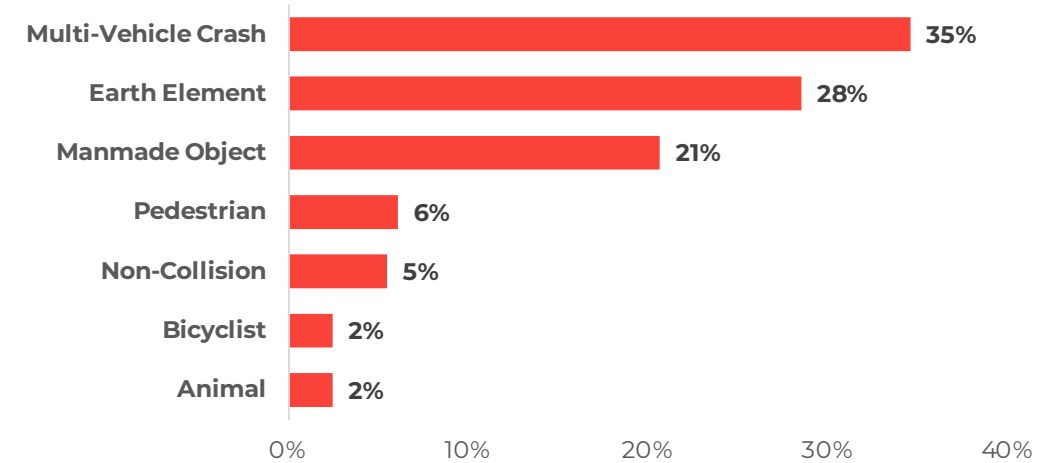
### Crash Type

- Multi-vehicle still the leading type, but higher shares of
  - *Earth element*
  - *Manmade object*

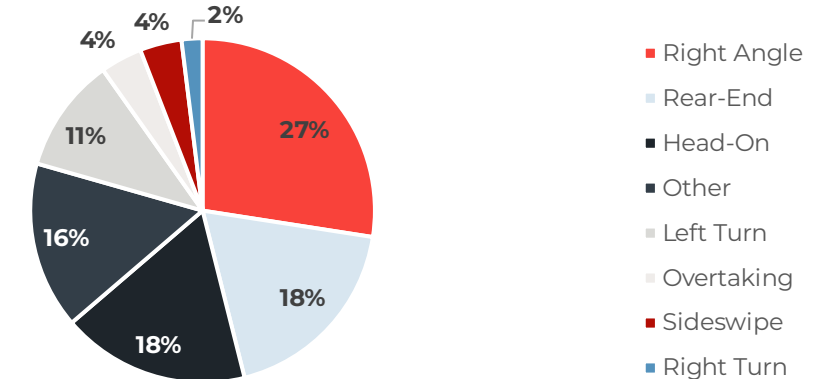
### Manner of Collision

- Nearly two-thirds of multi-vehicle crashes due to:
  - *Right Angle (“T-Bone”)*
  - *Rear-End*
  - *Head-On*

KSI Crashes by Crash Type



Manner of Collision for Multi-Vehicle KSI Crashes



# Crash Data Analysis – Fatal & Serious Injury

## Crash and Collision Types – Comparison

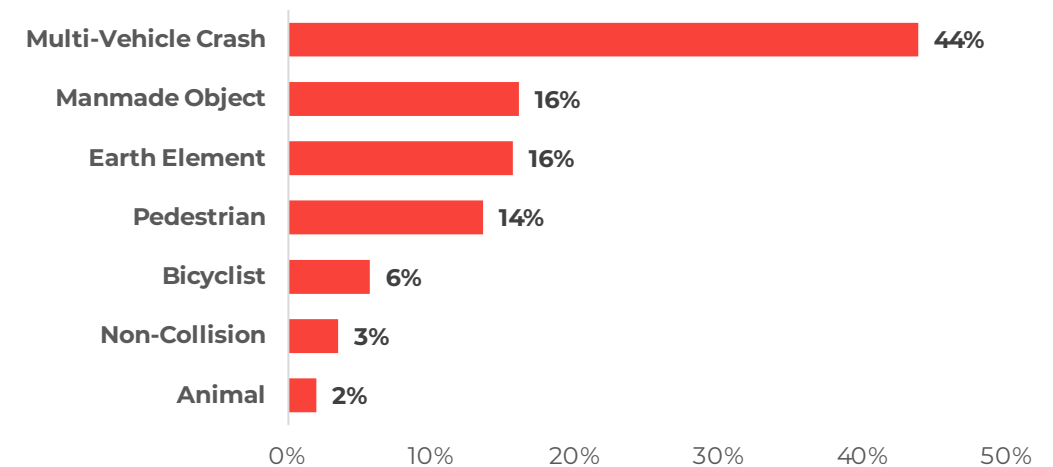
### Most Prevalent Crash Types

- Broome – Multi-Vehicle
- Tioga – Non-Vehicle, Non-VRU
- Broome – VRU-Involved

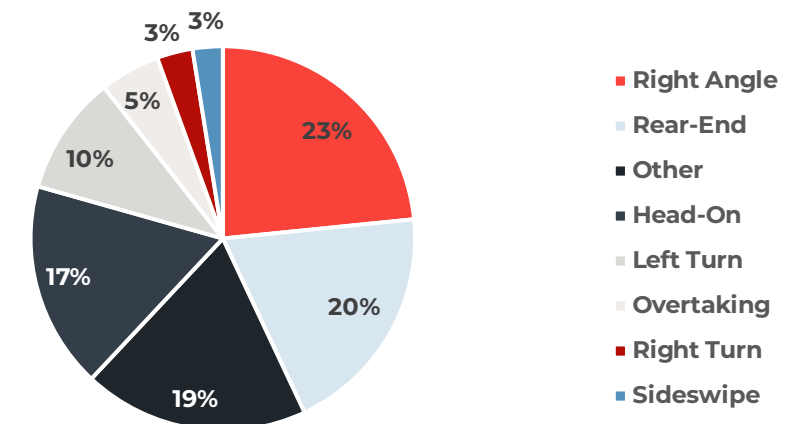
### Manner of Collision Comparison

- Largely similar distribution between counties
- Prevalence of Top 3
  - *Rear-End, Right Angle (T-Bone), and Head-On*
- Overrepresentation of “Other”

Region-Wide KSI Crashes by Crash Type



Region-Wide Manner of Collision





# Crash Data Analysis – Fatal & Serious Injury Contributing Actions

## Contributing Actions\*

- Primary causes when attributed
  - *Aggressive Driving*
  - *Driver Error*
- Impairment (Alcohol / Drugs)
  - *Approximately 10% of KSI crashes*
- Driver Distraction was not a major contributor
- ~10% (70 injury crashes) with no contributing action reported

*\* Some crashes have multiple actions while others have none*

| Rank | Cont. Action                        | % Crashes | Rank | Cont. Action                         | % Crashes |
|------|-------------------------------------|-----------|------|--------------------------------------|-----------|
| 1    | Unsafe Speed                        | 18.1%     | 19   | Fell Asleep                          | 1.9%      |
| 2    | Failure to Yield                    | 16.4%     | 20   | Obstruction/Debris                   | 1.4%      |
| 3    | Driver Inattention                  | 16.2%     | 20   | Reaction to Other Uninvolved Vehicle | 1.4%      |
| 4    | Unsafe Lane Change                  | 9.9%      | 20   | Brakes Defective                     | 1.4%      |
| 5    | Following Too Close                 | 8.3%      | 23   | Glare                                | 1.2%      |
| 6    | Passing/Unsafe Lane Usage           | 8.1%      | 24   | Fatigued/Drowsy                      | 1.1%      |
| 7    | Traffic Control Devices Disregarded | 8.0%      | 24   | Unsafe Backing                       | 1.1%      |
| 8    | Alcohol                             | 7.0%      | 26   | Passenger Distraction                | 1.0%      |
| 9    | Failure to Keep Right               | 5.4%      | 27   | Tire Failure/Inadequate              | 0.8%      |
| 10   | Slippery Pavement                   | 4.4%      | 28   | Physical Disability                  | 0.7%      |
| 11   | Lost Consciousness                  | 4.3%      | 28   | Steering Failure                     | 0.7%      |
| 12   | Turning Improper                    | 3.5%      | 30   | Outside Car Distraction              | 0.6%      |
| 13   | Illness                             | 3.3%      | 31   | Lane Marking Improper/Inadequate     | 0.3%      |
| 14   | Obstructed View                     | 3.2%      | 31   | Other Lighting Defects               | 0.3%      |
| 15   | Animals                             | 2.8%      | 31   | Cell Phone (Handheld)                | 0.3%      |
| 15   | Driver Inexperience                 | 2.8%      | 31   | Eating or Drinking                   | 0.3%      |
| 15   | Drugs (Illegal)                     | 2.8%      | 35   | Driverless/Runaway Vehicle           | 0.1%      |
| 18   | Aggressive Driving/Road Rage        | 2.2%      | 35   | Defective Accelerator                | 0.1%      |

# Crash Data Analysis – Key Takeaways

## SCALE OF PROBLEM (FATAL & SERIOUS INJURY)

- 724 KSI crashes ('19-23)
  - *71 fatal events*
  - *2021 peaked at 162 fatal or serious injury crashes*
- 20% involved
  - *Someone walking (14%)*
  - *Someone biking (6%)*
- 10% involved impairment (alcohol or drugs)

## KEY NOTES

- Intersection crashes more prevalent in Broome County
- Curves, as well as unlit conditions, more relevant for Tioga County
- Manner of Collision trend was similar for both
  - *Right Angle, Head-On, Rear-End play major role*

# Anticipated Further Crash Data Analysis

- Further analyze key trends unique to each county
- Nuanced analysis of key metrics including:
  - Posted speed limits*
  - Traffic volumes*
  - Crash location*
  - Intersection controls*
- Identify geographic clusters of specific conditions
  - Could potentially include, but is not limited to:*
    - Dark but Unlighted crashes
    - Non-Controlled intersections
    - Head-On collisions
- Identify trends for VRU-involved KSI crashes



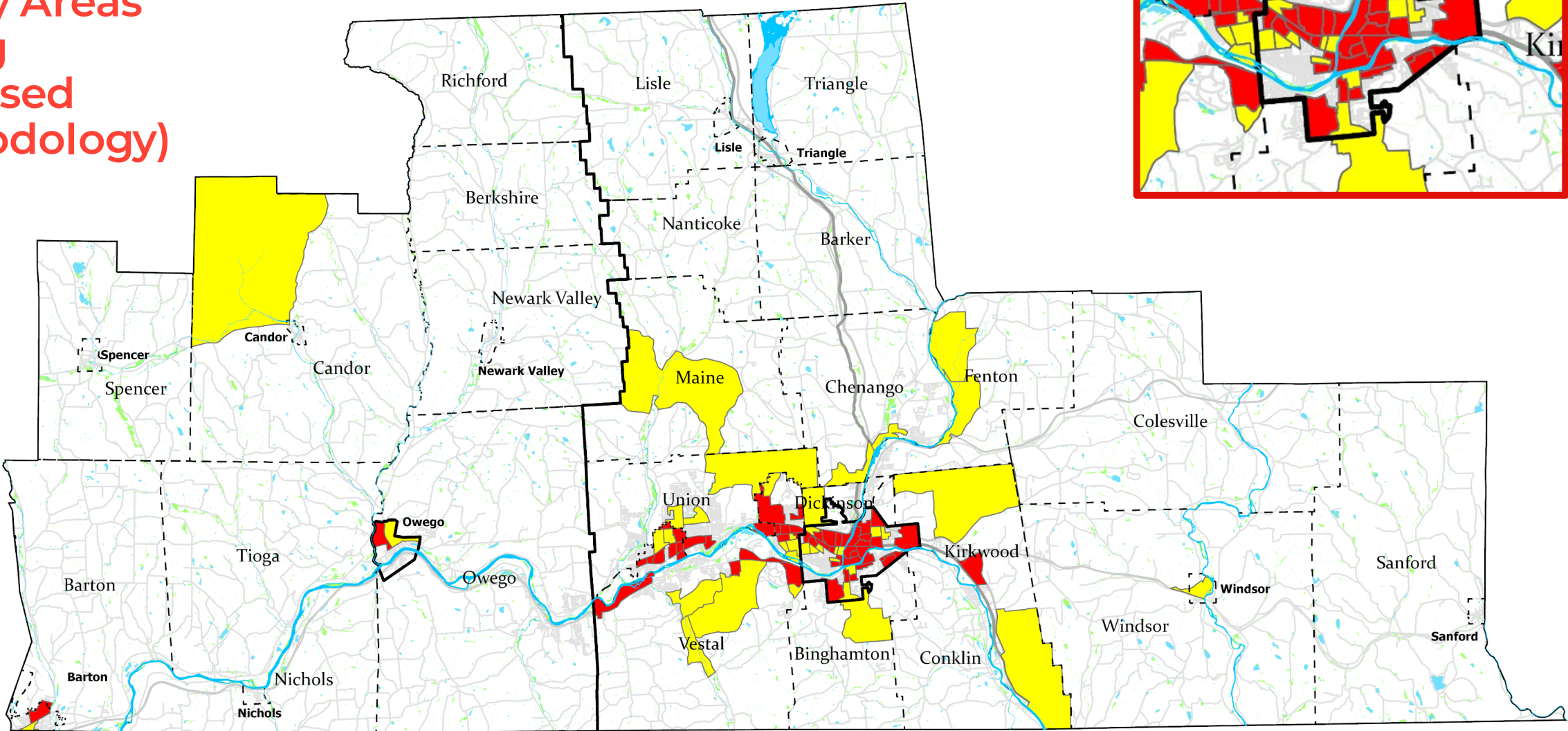
Equity Assessment



# Equity Assessment Proposed Methodology

- Block-level rankings, internal to BMTS region based on...
  - Youth*
  - Seniors*
  - Poverty*
  - Carless Households*
  - Race (Non-White Alone)*
  - Limited English Proficiency (LEP)*
  - People with Disabilities*
- “High” Regional Equity Community
  - Top 20% of region’s blocks*
- “Priority” Equity Area
  - Top 40% of region’s blocks*

Equity  
Assessment  
Equity Areas  
(Using  
Proposed  
Methodology)



**Regional Equity Vulnerability Index**

- High Regional Equity Priority Community ( Top 20% )
- Regional Equity Priority Community ( Top 37.6% )

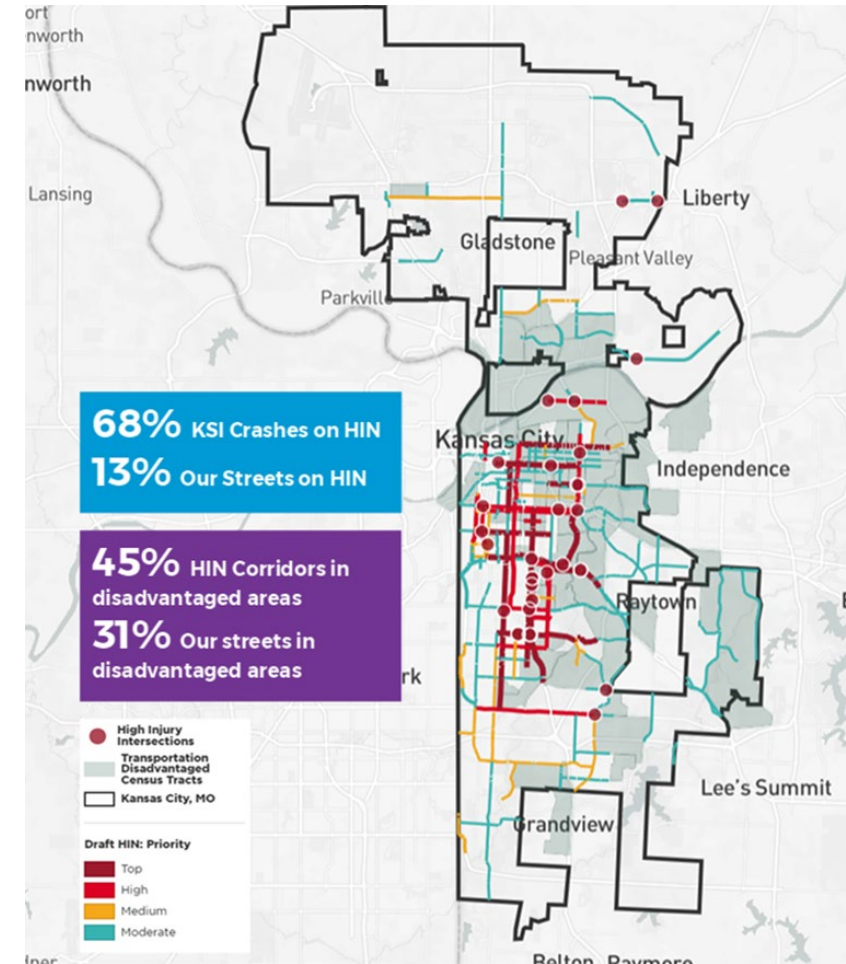


**Next Steps  
High Injury Network  
Systemic Analysis + High Risk Network**

**BMTS**

# Trends-Based Approach High Injury Network (HIN)

- **Retrospective tool** using 5-Year Crash History
- Targets areas with **high frequency and density** of crash events
- Helps **prioritize improvements** by creating a “risk score” or “weight” **based on injury severity**



Example of a High Injury Network



# Systemic Analysis Overview

- **Predictive** counterpart with a long-range orientation
  - *Scans crash history to generalize problems*
- Representation Ratios
  - *>1 = more risk than typical*
- Trends identified form basis for the High Risk Network

## POTENTIAL VARIABLES

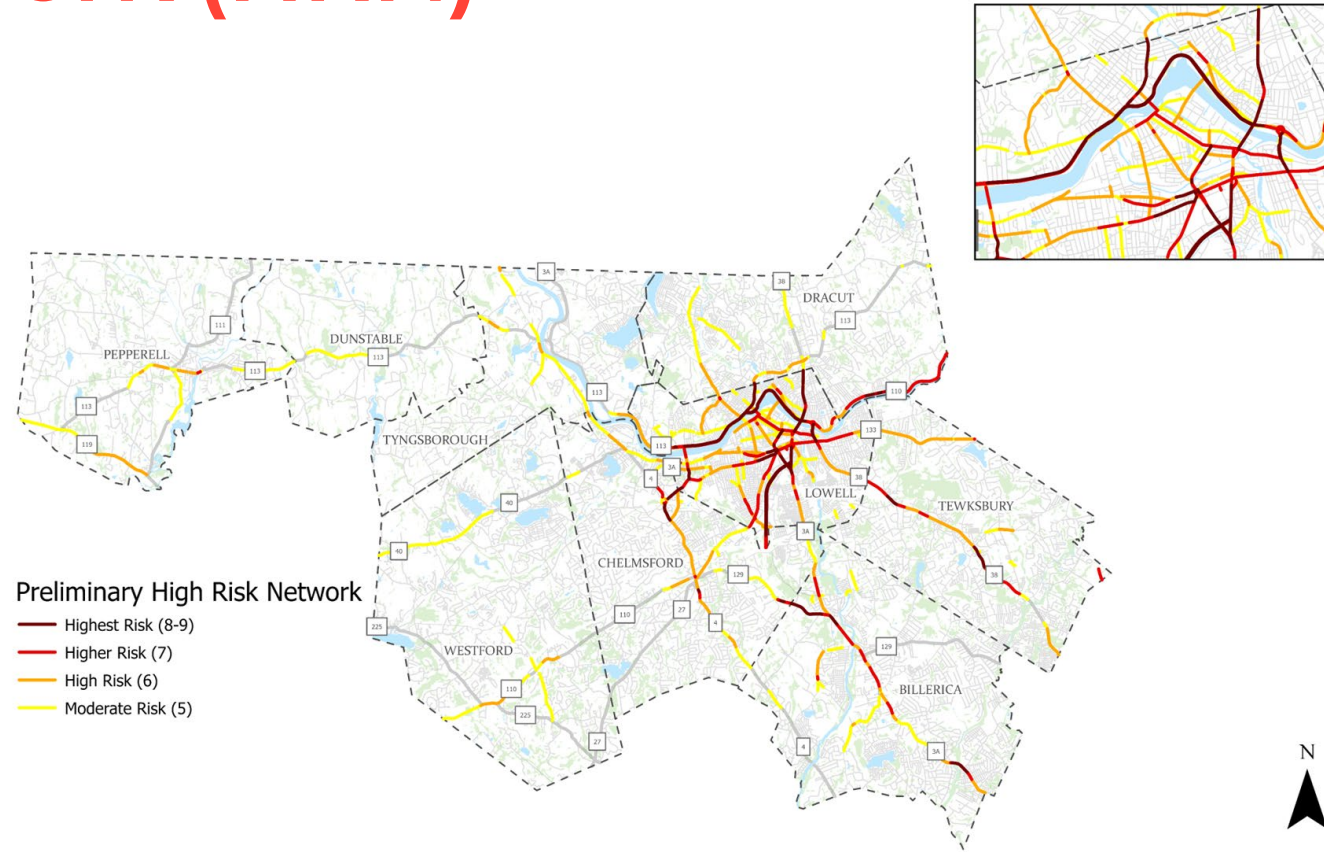
- Area type (urban, rural etc.)
- Equity area
- Roadway functional classification
- Lane count
- Average daily traffic
- Speed limit
- Designated truck route
- School zones
- Sidewalk presence
- Transit stop presence

# Risk-Based Approach High Risk Network (HRN)

—Forward-looking tool **proactively identifies** facilities to improve **before crashes take place**

—Based on **weighted risk factors** in a systemic analysis

- Summed across categories*
- Up to 10 points*



Example of a High Risk Network

An aerial photograph of a multi-lane highway curving through a valley. To the left of the highway is a golf course with green fairways and brown trees. The background shows rolling hills under a dramatic sky with orange, pink, and blue clouds. A white rounded rectangle is overlaid on the bottom left, and the BMTS logo is in the bottom right.

Questions & Comments?

**BMTS**

**THANK YOU!**