



Agenda

1. Introductions

- 2. USDOT SS4A Program& Safe System Review
- 3. Vision Statement & Goals

4. Branding Options

- 5. Introduction to Networks
 - a) High Injury Network
 - b) High Risk Network
- 6. Contributing Factors
- 7. Next Steps
- 8. Next PSC Meeting





Introductions

- Project Team
 - -BMTS
 - -Jennifer Yonkoski
 - -Leigh McCullen
 - -Scott Reigle
 - -WSP
 - –Joel Anders
 - -Han Bao
 - -Barton & Loguidice
 - -Mark Budosh
 - -EDR
 - -Laura Lourenco

- -Committee Members
 - -Ron Lake City of Binghamton
 - -Scott Mastin Broome County DPW
 - -Gary Hammond Tioga County DPW
 - -Greg Kilmer BC Transit
 - -Tony Signorelli NYSDOT Region 9
 - Christine Marion Broome County Traffic Safety Board
 - —Jennifer Lesko Broome County Urban League
 - Mark Goodwin Southern Tier Bicycle Club
 - Devin Link Broome County Health Department



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USDOT SS4A PROGRAM & SAFE SYSTEM OVERVIEW





Safe Streets & Roads for All (SS4A) Program Overview

USDOT Competitive Grant Program

- -Supports National Roadway Safety Strategy
- —Goal of Zero Roadway Deaths
- -Safe System Approach
- -Funded through 2026







SS4A Program Overview Secondary Benefits

Connects Safety with Other Benefits

—Equity

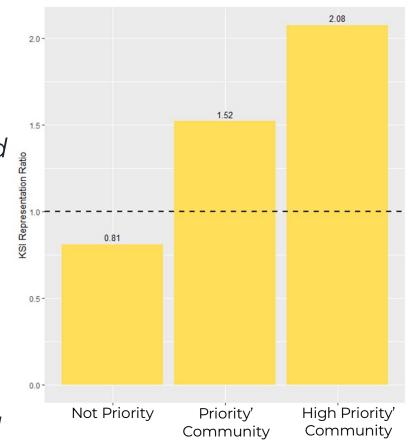
 Disadvantaged communities overrepresented in fatalities and serious injuries

-Multimodal Mobility

 Lack of (or limited connections between) adequate facilities to walk, bike, or roll

-Climate Change

 Investment in safe walking, biking, and rolling infrastructure (and transit) helps encourage mode shift, reducing overall crash exposure







SS4A Overview Achieving Vision Zero through the Safe System



Safe System approach Traditional approach Prevent crashes Prevent death and serious injuries Improve human behavior → Design for human mistakes/limitations **Control speeding** Reduce system kinetic energy Individuals are responsible Share responsibility Act based on crash history Proactively identify and address risks

VISION STATEMENT & GOALS





Draft Vision Statement



The BMTS region provides safe travel for all residents and visitors, with zero traffic-related deaths and serious injuries.

Stakeholders work collaboratively to apply a Safe System approach that proactively identifies and addresses safety issues in the transportation system, with special attention to the most vulnerable users. The approach promotes safe behaviors, vehicles, speeds, and roads, including through resilient, human-centered designs that account for human vulnerabilities and human error to prevent and reduce injury. Robust post-crash care is available to prevent death and secondary crashes.





Draft Goals



- Zero fatal and serious injury crashes by YEAR
- Safe, responsible driving and road user behavior
- 3. Safer speeds in all roadway environments
- 4. Effective evidence-based data analysis and transparent reporting that enables preventative action
- 5. Emergency response practices increase safety for road users and first responders
- Community Engagement and Collaboration







Branding Options

Campaign Serif

Peridot PE Variable Narrow

Logo Choice 1





Logo Choice 2





INTRODUCTION TO NETWORKS

High Injury Network / High Risk Network





Introduction to Networks High Injury vs. High Risk Comparison

High Injury Network

- Reactive, Location-based
- Where?
 - Have (the most severe) crashes occurred in the last five years?
- Where are they clustered?

Orient short- and mid-term investments

High Risk Network

- Predictive, Element-based
- What?
 - Elements (e.g., lanes, activity levels) that tended to contribute to crashes?
- Where might we expect to more severe crashes in the future?
- Target mid- and long-term improvements





High Injury Network How Weights Were Applied

-Emphasizing Crashes that Resulted in the Most Severe Injuries

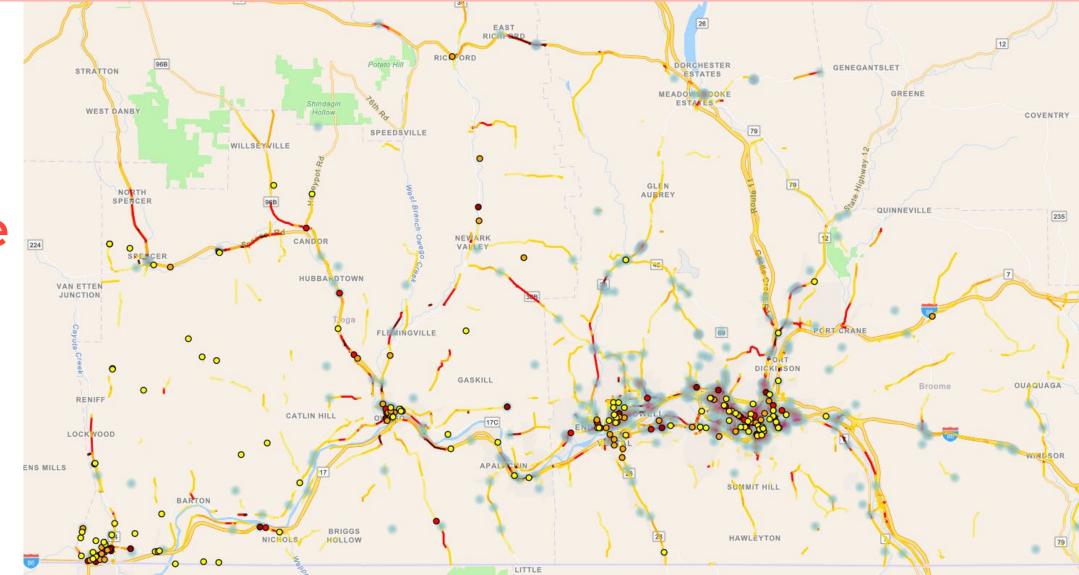
Limit Noise byBalancing Weights

Score Applied	Injury Description	Other Terms Often Used	Severity Code
15	Fatal Injury	Killed	K
5	Serious Injury	Incapacitating	A (SI)
2	Minor Injury	Non-Incapacitating	В
1	Possible Injury	Possible	С
0	No Injury	Property Damage Only	0



HIGH INJURY NETWORK CORRIDORS AND INTERSECTIONS

Broome County









High Injury Network Broome County Corridors

COUNT OF CRASHES

High Injury Network Ranking	Count of K+A Crashes	Count of Fatal (K) Crashes	Count of Serious Injury (A) Crashes	Count of All Injury (KABC) Crashes
1%	112	14	98	534
3%	199	25	174	913
5%	236	29	207	1,140
10%	295	37	258	1,476
15%	323	37	286	1,618
TOTAL 2,258 mi.	334	37	297	1,822

SHARE OF CRASHES

High Injury Network Ranking	Share of K+A Crashes	Share of Fatal (K) Crashes	Share of Serious Injury (A) Crashes	Share of All Injury (KABC) Crashes
1%	34%	38%	33%	29%
3%	60%	68%	59%	50%
5%	71%	78%	70%	63%
10%	88%	100%	87%	81%
15%	97%	100%	96%	89%
TOTAL 2,258 mi.	100%	100%	100%	100%







High Injury Network Broome County Top Corridors

- -Rt 26 from Nanticoke Creek to Daugherty Rd
- -Rt 434 from Rt 26 to Normandy Ct
- -Vestal Rd from Willow Run Creek to Rt 201
- —E Main St from S Kelly Ave to Endwell St
- -Main St from Hamilton St to Collier St
- -Front St from Johnson Rd to Pamela Dr

SEE EXCEL TABLE FOR MORE INFO

- Corridor Name, From / To, Municipality
- Crash Counts by Severity
- Jurisdiction, Length







COUNT OF CRASHES

High Injury Intersection Ranking	Count of K+A Crashes	Count of Fatal (K) Crashes	Count of Serious Injury (A) Crashes	Count of All Injury (KABC) Crashes
Top 20	45	3	42	205
Top 40	79	9	70	299
Top 60	102	9	93	419
Top 80	119	9	110	507
Top 100	133	9	124	586
TOTAL	225	9	216	1,371

SHARE OF CRASHES

High Injury Intersection Ranking	Share of K+A Crashes	Share of Fatal (K) Crashes	Share of Serious Injury (A) Crashes	Share of All Injury (KABC) Crashes
Top 20	20%	33%	19%	15%
Top 40	35%	100%	32%	22%
Top 60	45%	100%	43%	31%
Top 80	53%	100%	51%	37%
Top 100	59%	100%	57%	43%
TOTAL	100%	100%	100%	100%





High Injury Network Broome County Top Intersections



ı	Facility	Municipality	Severity Score	Count of K Crashes	Count of A Crashes	Count of B Crashes	Count of C Crashes	Count of 0 Crashes	Total Crashes (KABCO)
	Court St & Brandywine Ave	Binghamton	41	0	3	7	12	69	91
	Vestal Pkwy E & S Washington St	Binghamton	38	0	5	4	5	52	66
	Vestal Pkwy E & Rano Blvd	Vestal	29	0	1	7	10	71	89
	Main St & Beethoven St	Binghamton	27	0	4	2	3	21	30
	Harry L Dr & Reynolds Rd	Union	26	0	0	12	2	90	104
	Court St & State St	Binghamton	26	0	2	5	6	38	51
	Front St & Bevier St	Dickinson	22	0	2	6	0	12	20
	N Street & N Mckinley Ave	Union	22	0	3	2	3	33	41







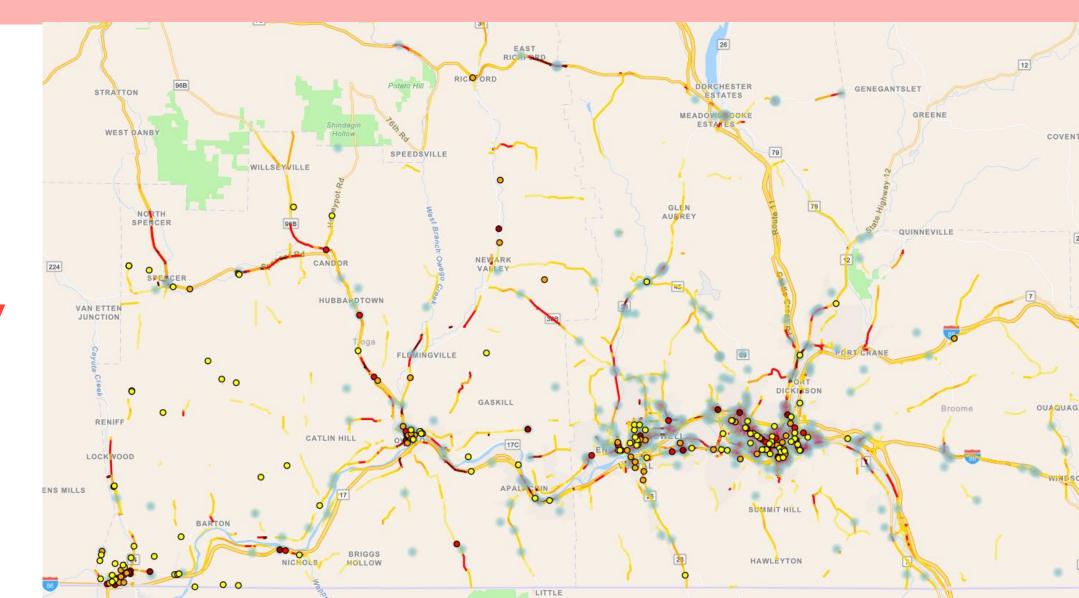


- —Are There Places You Expected to See That Do Not Appear in the HIN?
 - -Specific Facilities
 - -Parts of the County
- -Common Locations for Near-Misses
- -What Feels Unsafe?



HIGH INJURY NETWORK CORRIDORS AND INTERSECTIONS

Tioga County









High Injury Network Tioga County Corridors



COUNT OF CRASHES

High Injury Network Ranking	Count of K+A Crashes	Count of Fatal (K) Crashes	Count of Serious Injury (A) Crashes	Count of All Injury (KABC) Crashes
1%	43	12	31	107
3%	77	22	55	211
5%	97	24	73	292
10%	131	24	107	444
15%	145	24	121	520
TOTAL 1,323 mi.	146	24	122	621

SHARE OF CRASHES

High Injury Network Ranking	Share of K+A Crashes	Share of Fatal (K) Crashes	Share of Serious Injury (A) Crashes	Share of All Injury (KABC) Crashes
1%	29%	50%	25%	17%
3%	53%	92%	45%	34%
5%	66%	100%	60%	47%
10%	90%	100%	88%	71%
15%	99%	100%	99%	84%
TOTAL 1,323 mi.	100%	100%	100%	100%







High Injury Network Tioga County Top Corridors

- -Rt 34 from Liberty St to Town Boundary
- -Rt 34 from Ellison Rd to Camptown Rd
- -North Ave from Catatonk Creek to Tuttle Hill Rd
- —North Ave from East Ave to Court St Bridge
- -Rt 434 from W Main St to Tioga Blvd
- -Rt 434 from Summit Rd to NYS 17 Access Rd

SEE EXCEL TABLE FOR MORE INFO

- Corridor Name, From / To, Municipality
- Crash Counts by Severity
- Jurisdiction, Length







High Injury Network Tioga County Intersections

COUNT OF CRASHES

High Injury Intersection Ranking	Count of K+A Crashes	Count of Fatal (K) Crashes	Count of Serious Injury (A) Crashes	Count of All Injury (KABC) Crashes
Top 20	19	1	18	46
Top 40	19	1	18	69
Top 60	19	1	18	91
Top 80	19	7	18	96
Top 100	19	1	18	96
TOTAL	19	1	18	96

SHARE OF CRASHES

High Injury Intersection Ranking	Share of K+A Crashes	Share of Fatal (K) Crashes	Share of Serious Injury (A) Crashes	Share of All Injury (KABC) Crashes
Top 20	100%	100%	100%	48%
Top 40	100%	100%	100%	72%
Top 60	100%	100%	100%	95%
Top 80	100%	100%	100%	100%
Top 100	100%	100%	100%	100%
TOTAL	100%	100%	100%	100%







High Injury Network Tioga County Top Intersections



Facility	Municipality	Severity Score	Count of K Crashes	Count of A Crashes	Count of B Crashes	Count of C Crashes	Count of 0 Crashes	Total Crashes (KABCO)
State Rt 38 & Private Rd	Newark	15	1	0	0	0	0	1
Cayuta Ave & Ithaca St	Waverly	12	0	2	1	0	1	4
State Rt 17 C & Talmadge Hill Rd	Barton	12	0	2	1	0	1	4
Day Hollow Rd & Foster Valley Rd	Union	9	0	1	2	Ο	0	3
W River Rd & Highway 282	Nichols	7	0	1	1	0	2	4
Broad St & Fulton St	Waverly	7	0	0	2	3	16	21
Chemung St & Clark St	Waverly	7	0	0	3	1	3	7
Chemung St & Lincoln St	Waverly	7	0	1	1	0	4	6







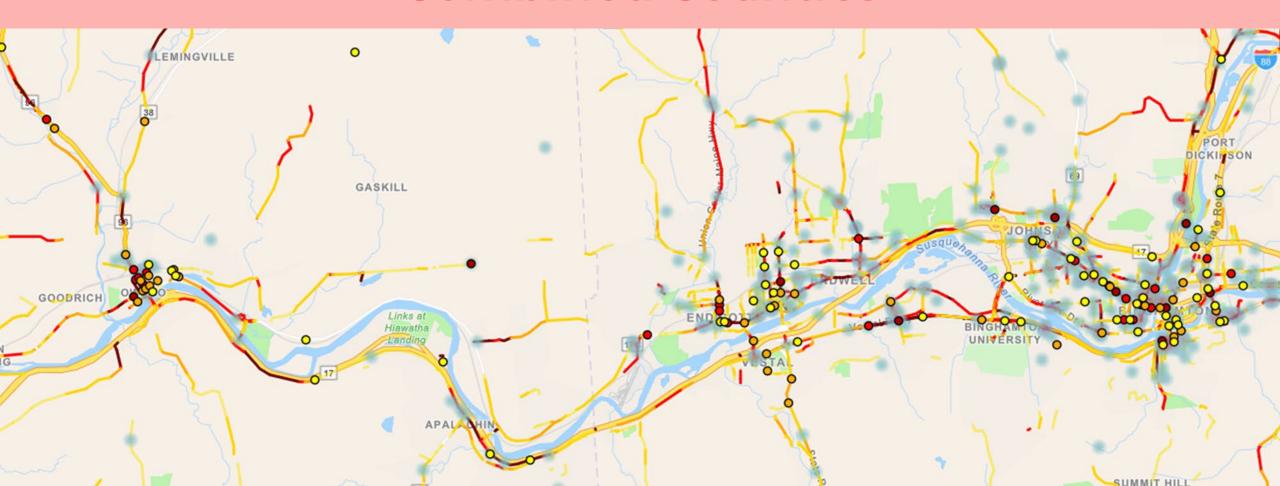


- —Are There Places You Expected to See That Do Not Appear in the HIN?
 - -Specific Facilities
 - -Parts of the County
- —Common Locations for Near-Misses
- —What Feels Unsafe?



SYSTEMIC ANALYSIS & HIGH RISK NETWORK

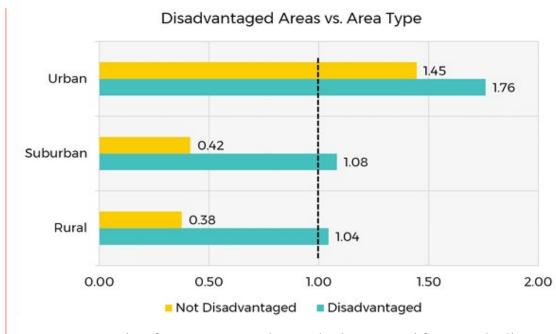
Combined Counties





Systemic Analysis Overview

- Predictive Counterpart to the High Injury Network
 - -Scans history to generalize problematic elements and conditions
- Representation RATIOs
 - -> 1.00 = More risk than typical
 - -Compared to "typical" roadway, [feature] creates a [X] times greater risk of a crash resulting in a Fatality or Serious Injury
- Trends Identified Inform Weighting Used in the High Risk Network



Example of a representation ratio, borrowed from a similar study in Omaha, NE

Fatal or Serious _{roadway type}

Miles _{roadway type}

Fatal or Serious _{region}

Miles _{region}





High Risk Network Weighting Rubric (Scaled to 100)

Category	Variable Assessed	Maximum HRN Points Proposed
Road Geometry	Number of Lanes	12
Road Regulations	Posted Speed Limit	24
Road Operations	Car Volumes	36
Road Operations	One-Way / Two-Way	10
Road Operations	Non-Car (Walk & Bike) Volumes	12
Demographics	Community Analysis	6
ALL	TOTAL	100



Being

Refined



High Risk Network Weighting Rubric (Scaled to 100)

Category	Variable Assessed	Risk Factor	HRN Points Proposed	KSI Risk Ratio	Injury Risk Ratio
	Number of Lanes	5 Lanes	12	0.00	16.10
		4 Lanes	12	4.72	9.79
Road		3 Lanes	4	1.61	4.02
Geometry		2 Lanes	2	0.97	0.88
		1 Lane	2	1.38	1.77
		No Data	0	0.41	0.58
Road Regulations	Posted Speed Limit	55+ MPH	24	1.72	4.73
		40 –50 MPH	24	4.25	4.16
		30 –35 MPH	18	3.64	4.31
		0 -25 MPH	0	0.55	0.44
Road Operations	Car Volumes	Greater than 15k	36	9.29	30.43
		10k-15k	24	8.11	15.44
		5k-10k	18	5.76	6.45
		2.5k – 5k	12	4.20	3.53
		Under 2.5k	2	0.62	0.49
		No Data	0	0.22	0.16





High Risk Network Rubric (Scaled to 100)

Continued from last slide

Category	Variable Assessed	Risk Factor	HRN Points Proposed	KSI Risk Ratio	Injury Risk Ratio
Road Operations	One-Way / Two-Way	Two-Way	10	0.96	0.87
		One-Way	0	2.86	6.76
	Non-Car (Walk & Bike) Volumes	High Activity	12	4.76	6.08
Road Operations		Moderate Activity	6	2.82	3.80
		Low Activity	2	0.84	0.72
		No Data	0	0.18	0.09
Demographics	Community Analysis	High Priority Community (Top 20%)	6	2.24	3.12
		Priority Community (Top 40%)	3	1.50	1.63
		Neither of the Above	0	0.81	0.71







High Risk Network Combined Counties



COUNT OF CRASHES

High Risk Network Ranking	Count of Total Mileage	Count of K+A Crashes	Count of Fatal (K) Crashes	Count of Serious Injury (A) Crashes	Count of All Injury (KABC) Crashes
Highest (≥ 65)	33	48	2	46	366
Higher (≥50)	112	110	7	105	830
High (≥35)	339	230	30	201	1,440
Moderate (≥20)	723	317	43	271	1,814
TOTAL	3,581	480	61	419	2,441

SHARE OF CRASHES

High Risk Network Ranking	Share of Total Mileage	Share of K+A Crashes	Share of Fatal (K) Crashes	Share of Serious Injury (A) Crashes	Share of All Injury (KABC) Crashes
Highest (≥65)	1%	10%	3%	11%	15%
Higher (≥50)	3%	23%	11%	25%	34%
High (≥35)	9%	48%	48%	48%	59%
Moderate (≥20)	20%	66%	70%	65%	74%
TOTAL	100%	100%	100%	100%	100%



Subject to Refinement (Speed Limit)



High Risk Network Opportunity for Feedback

—Are there variables or risk factors that you would change or add?



CONTRIBUTING FACTORS

Further Analysis of High Injury Network & Historical Crash Locations





Crash Data Analysis Factors Assessed

- —Time of Day
- -Lighting
- -Weather
- —Roadway Condition

- -Location
 - -Intersection Control
 - -Roadway Geometry
- -Crash Type
 - -Manner of Collision

—Contributing Actions





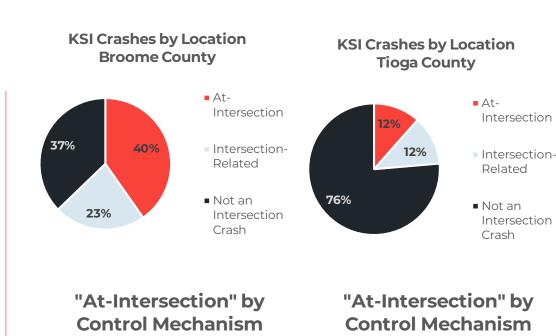
Crash Data Analysis – Fatal & Serious Injury **Crash Location and Intersection Control**

Crash Location

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

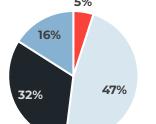
Intersection Control

- 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"





Broome County





Tioga County

Stop Sign

No Control Mechanism

Other Signage







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

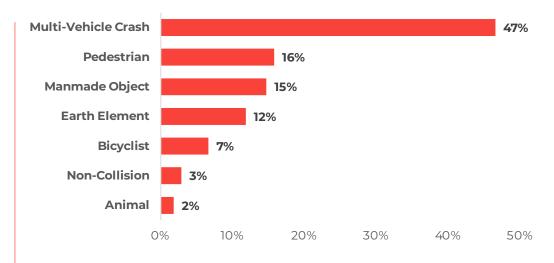
Crash Type

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

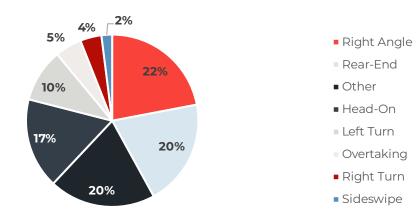
Manner of Collision

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

KSI Crashes by Crash Type

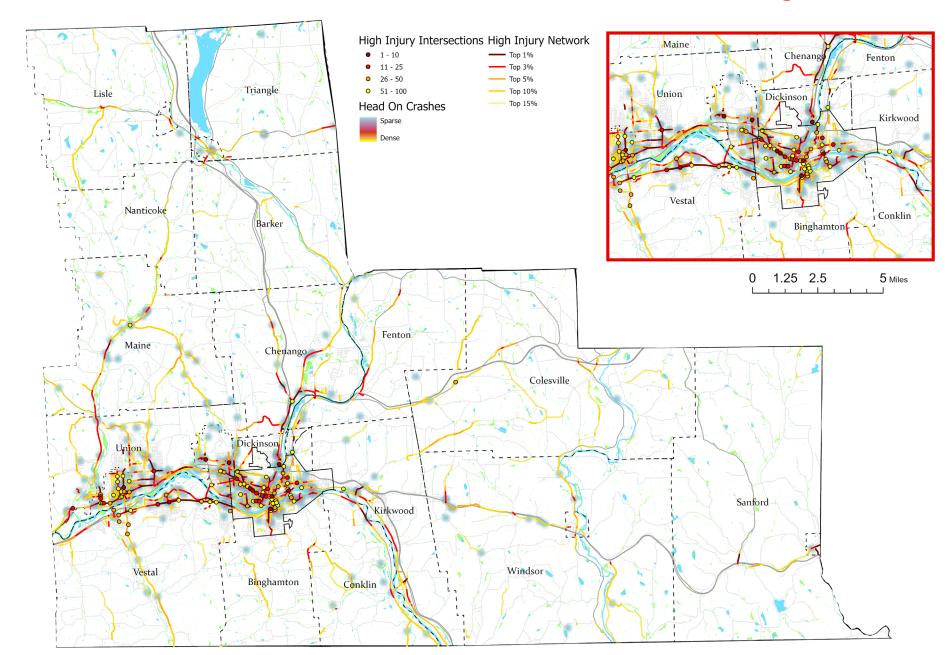


Manner of Collision for Multi-Vehicle KSI Crashes





Head On Crashes – Broome County







Crash Data Analysis – Fatal & Serious Injury Crash and Collision Types – Tioga County

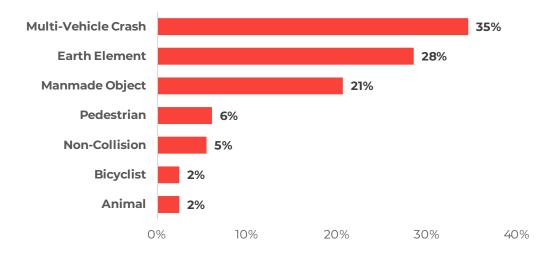
Crash Type

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

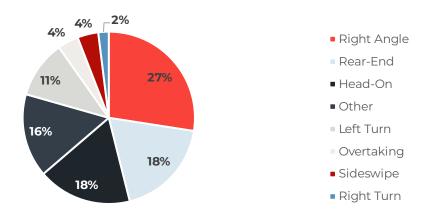
Manner of Collision

- Nearly two-thirds of multivehicle crashes due to:
 - Right Angle ("T-Bone")
 - Rear-End
 - Head-On

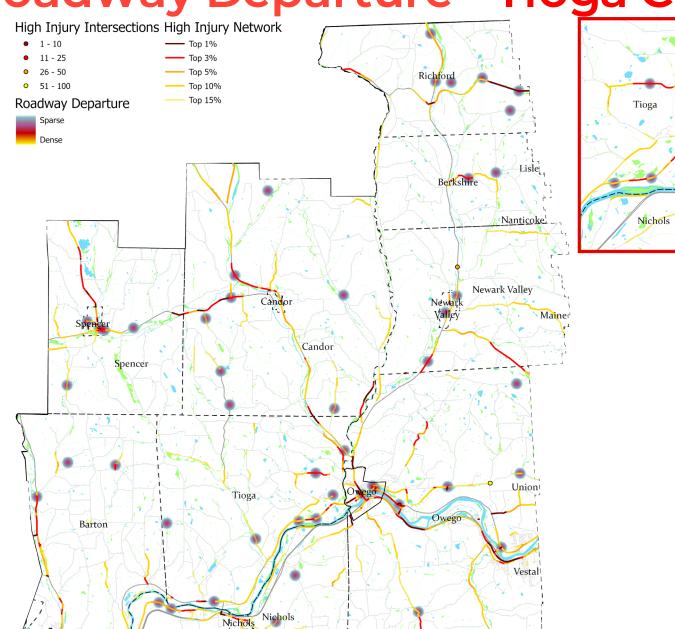
KSI Crashes by Crash Type

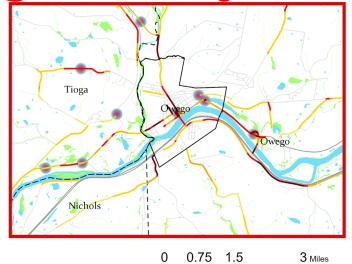


Manner of Collision for Multi-Vehicle KSI Crashes



Roadway Departure – Tioga County









PREVIOUSLY PRESENTED

Contributing Actions*

- Primary Causes when Attributed
 - Aggressive Driving
 - Driver Error
- Impairment (Alcohol / Drugs)
 - Approximately 10% of KSI crashes
- ~10% (70 injury crashes) did not have an action reported
- * Some crashes have multiple actions while others have none

Rank	Cont. Action	% Fatal & Serious Injury Crashes	Rank	Cont. Action	% Fatal & Serious Injury 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%





Contributing Actions – All Crashes **Combined Counties**

• RATIO = Compared to all crashes, how much more likely was the factor to result in a fatal, serious injury, etc. crash?

• RATIO ≥ 2.0 considered a potential priority

Contributing Action (As Reported by Officer)	Total Crash Count (KABCO)	Share of Total Crashes (KABCO)	RATIO – Fatal Injury (K)	RATIO – Fatal or Serious Injury (KA)	RATIO – All Injury (KABC)
Failure to Yield Right of Way	2,887	11%	1.1	1.9	2.1
Unsafe Speed	1,755	6%	3.8	2.7	1.9
Passing or Improper Lane Usage	1,644	6%	2.6	1.9	1.5
Unsafe Lane Change	1,487	5%	7.4	3.2	1.7
Traffic Control Devices Disregarded	1,013	4%	2.0	2.1	2.6
Impairment	719	3%	4.7	3.6	2.2
View Obstructed / Limited	551	2%	2.7	0.8	1.0
Failure to Keep Right	527	2%	1.4	2.5	2.4
Aggressive Driving / Road Rage	175	1%	20.9	5.3	1.7





Contributing Actions – All Crashes

Broome County

 RATIO = Compared to all crashes, how much more likely was the factor to result in a fatal, serious injury, etc. crash?

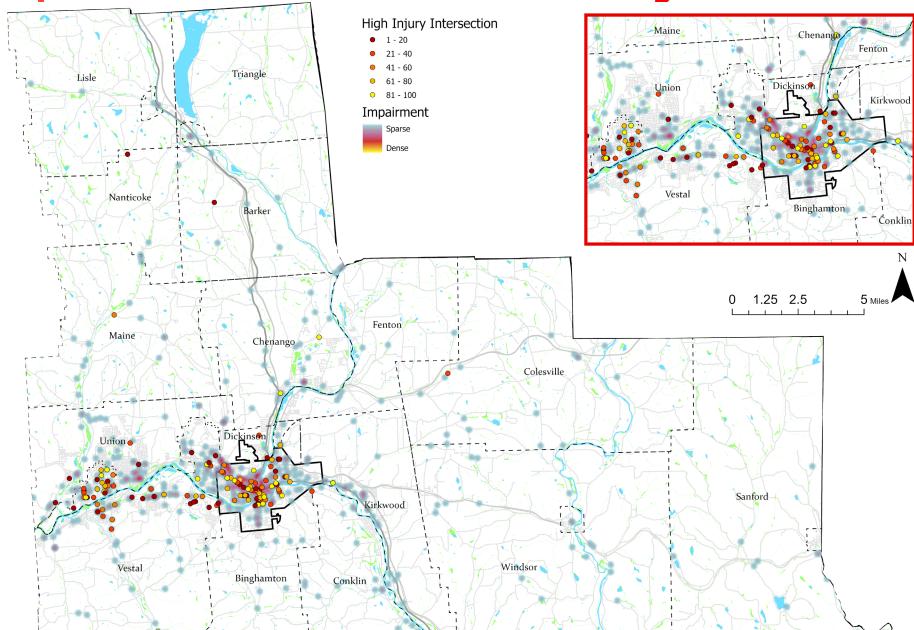
• RATIO ≥ 2.0 considered a potential priority

Contributing Action (As Reported by Officer)	Total Crash Count (KABCO)	Share of Total Crashes (KABCO)	RATIO – Fatal Injury (K)	RATIO – Fatal or Serious Injury (KA)	RATIO – AII Injury (KABC)
Unsafe Lane Change	1,283	6%	2.7	1.5	1.0
Unsafe Speed	1,256	6%	4.3	2.7	1.7
Traffic Control Devices Disregarded	919	4%	2.7	2.2	2.2
Impairment	593	3%	3.3	3.8	1.6
Failure to Keep Right	388	2%	10.1	2.8	1.7
Aggressive Driving / Road Rage	148	1%	3.3	3.0	1.4



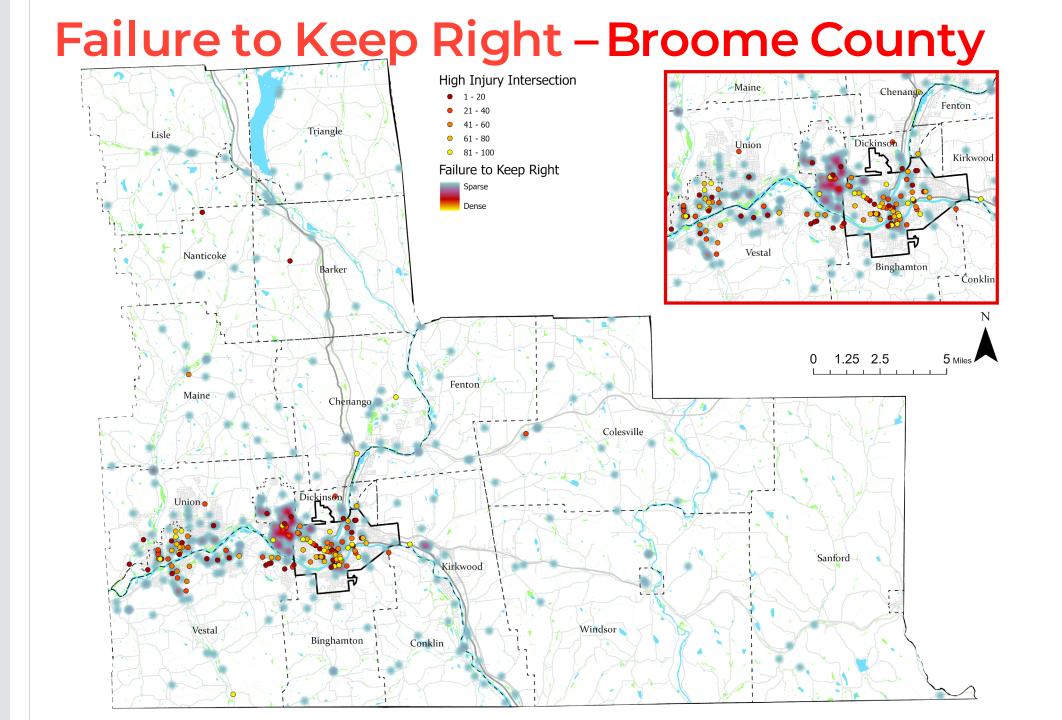
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Impairment – Broome County













Contributing Actions Tioga County

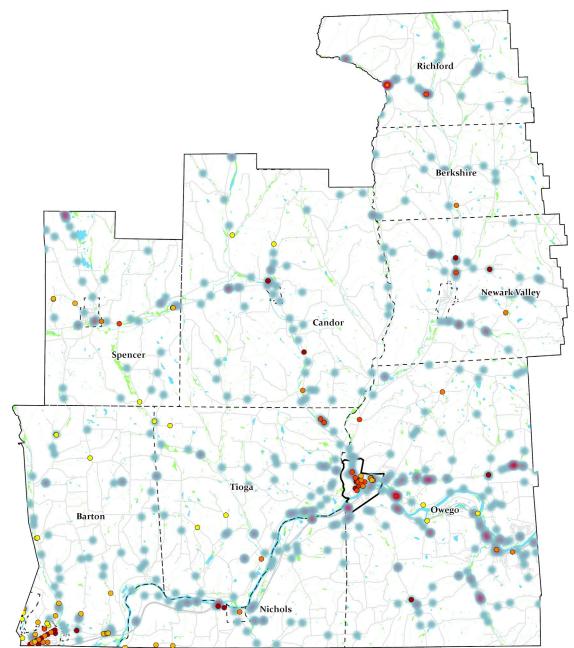
- RATIO = Compared to all crashes, how much more likely was the factor to result in a fatal, serious injury, etc. crash?
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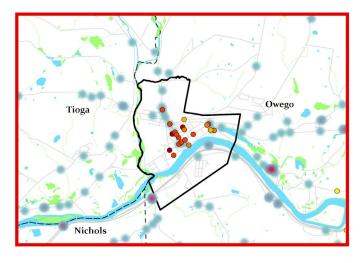
Contributing Action (As Reported by Officer)	Total Crash Count (KABCO)	Share of Total Crashes (KABCO)	RATIO – Fatal Injury (K)	RATIO – Fatal or Serious Injury (KA)	RATIO-All Injury (KABC)
Unsafe Speed	499	11%	3.8	2.7	1.9
Failure to Yield Right of Way	359	8%	1.0	1.9	2.1
Passing or Improper Lane Usage	284	6%	2.6	1.9	1.5
Unsafe Lane Change	204	4%	7.4	3.2	1.7
Failure to Keep Right	139	3%	1.3	2.5	2.4
Impairment	120	3%	4.7	3.6	2.2
Traffic Control Devices Disregarded	94	2%	2.0	2.1	2.6
View Obstructed / Limited	69	2%	2.7	0.8	1.0



(1)

Unsafe Speed – Tioga County







High Injury Intersection

- 1 20
- 21 40
- 41 60
- 61 80
- 81 100

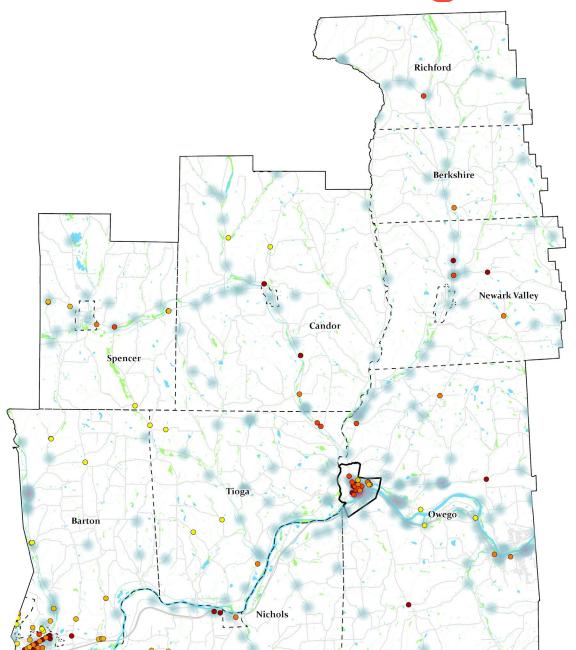
Unsafe Speed

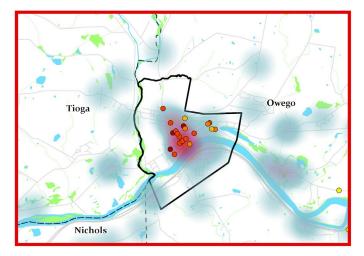
Sparse Dense





Unsafe Lane Change – Tioga County







High Injury Intersection

- 1 20
- 21 40
- 41 60
- 61 80
- 81 100

Unsafe Lane Change

Sparse Dense



NEXT STEPS





Next Steps Public Engagement

Focus Groups - June

Focus Group	Stakeholder Group 1	Stakeholder Group 2	Stakeholder Group 3
#1	Law Enforcement	State Highway Officials	Emergency Medical Services (EMS) / 1st Responders
#2	Disability Community	Diversity & Inclusion	
#3	Seniors	Rural Health	Local School District

Community Survey & Interactive Map – June

- Online

Community Pop-Ups

- Summer / Fall
- Recommended locations and events?
- Table top activity and promotion of survey





Next Steps Technical Pieces

Advancing Networks

- -Incorporate Input
 - Project Steering Committee
 - Focus Groups
- -Determine Overlap

Develop Projects

- -Identify Potential Locations
- Concept-LevelCountermeasures forVarious Locations
- —Prioritization among Projects (Safety Merit)



NEXT PSC MEETING





Next PSC Meeting What To Expect from PSC #3

- –Progress Summary: Outreach
- Progress Summary:Projects
 - -Potential locations
 - -Countermeasure menu

- -Date: TBD
 - -Timing dependent on progress in two areas
 - —Technical progress
 - -Outreach campaign
 - -Likely Fall
 - Potentially earlier if outreach advances is fully complete



THANK YOU!

