



# Regional High Injury Network (HIN)

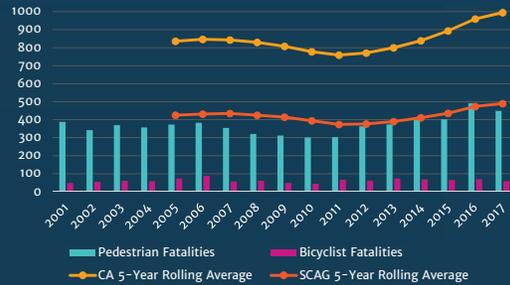
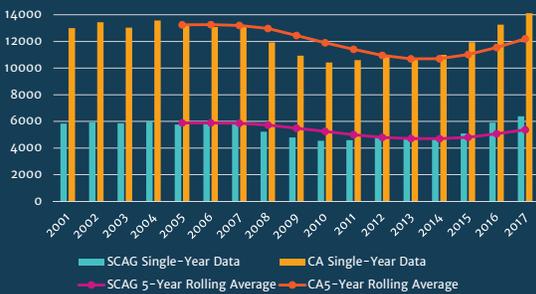
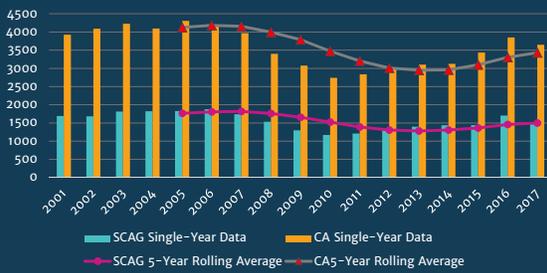
Toolbox Training

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 04.16.2019

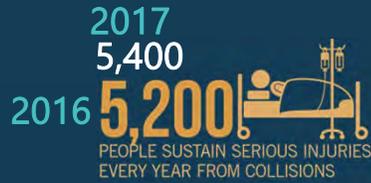
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## Review Crash Trend



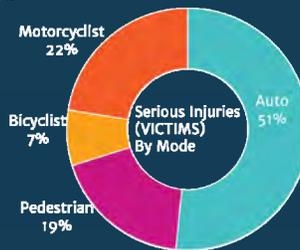
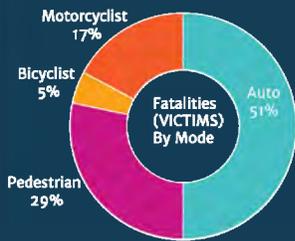
## Review Crash Trend



## Review Crash Trend



### FSI by Mode



### THE TOP THREE CONTRIBUTING FACTORS FOR ALL COLLISIONS



### THE TOP THREE CONTRIBUTING FACTORS FOR FATAL COLLISIONS



### THE TOP THREE CONTRIBUTING FACTORS FOR SERIOUS INJURIES



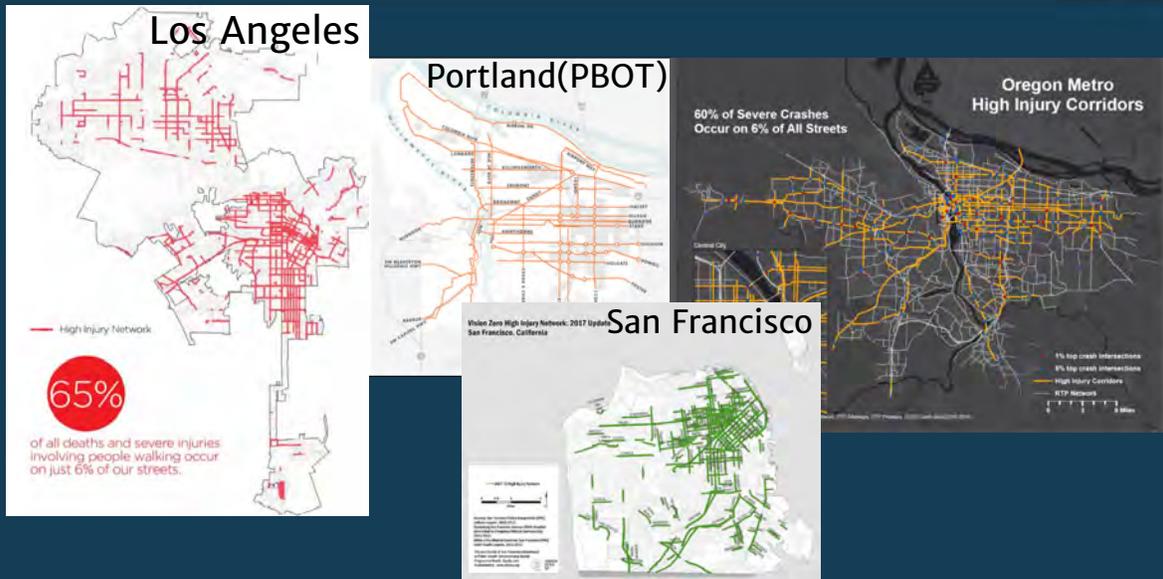
## What is an HIN?

- Stretches of roadways where the highest concentrations of collisions occur on the transportation network
- Typically a subset of the network where the most collisions are occurring (>50%)
- Not an assessment of whether a street or location is dangerous
- Rather, streets with a higher risk of injury than other streets

## Why is SCAG exploring an HIN?

- Inspire more local efforts to develop HINs
- Collectively explore and share best practices for HINs
- Help jurisdictions focus on most challenging areas
  - Implement cost effective countermeasures
  - Coordinate with educational campaigns (e.g., GoHuman)
  - Prioritize investments
- Ultimately, help the region more effectively work towards reducing serious injuries and fatalities (achieving its safety targets)

## Case Studies



## HIN Considerations



- How many years of data?
- All collisions or fatal/serious injury collisions?
- Collisions by modes?
- Collisions with child or senior involvement?
- Collisions in communities of concern?
- Collisions by intersection- or corridor-level?

## SCAG Goals for HIN



- Be sensitive to differing county contexts
- Be replicable
- Be quantifiable
- Focus on fatal and serious injury crashes
- Consider all modes of travel, but provide the option for reviewing only auto-auto, auto-bike, auto-pedestrian collisions
- Identify high injury corridors and not only hot spots
- Include segments that are normalized by length (one mile)

## SCAG's Draft Methodology



- Five years of collision data (2010-2014)
- Data sources: SWITRS, TIMS, TomTom
- Only fatal and serious injury collisions
  - Auto - Auto collisions
  - Auto - Pedestrian collisions
  - Auto - Bike collisions
- Analysis of corridors, not intersections
- Normalized by length- one mile
- Excluded freeways
- Assess on county basis vs. entire region (concern about entire focus shifting to one county due to higher numbers)
- No current weighting for collisions involving children/seniors, bicyclists/pedestrians, or occurring in Communities of Concern (only an overlay)

## 5 Step Method

### 1. Collect data

- Collision data – point file
- Street network data – line file

### 2. Prepare Collision data

- Exclude collisions on state highway (select by attributes and export)
- Exclude injury collisions and property damage only collisions

### 3. Prepare Street network data

- Exclude Functional Road classification 1, 2 and 6, 7 (select by attributes and export)
- Dissolve streets to create a line segment (Dissolve)
- Break streets equally by 1 mile

### 4. Assign Collision (point) to Street Network (line)

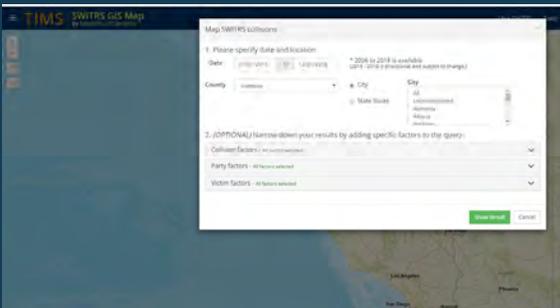
- Use Near tool to transfer points to line

### 5. Symbology

- Identify threshold

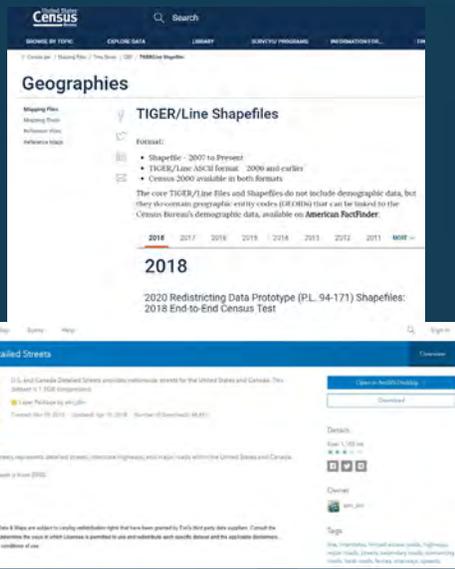
## 1. Collect Collision data and Street line data

Collisions: SWITRS, TIMS



US Census,  
North  
America  
detailed  
streets

Streets:



## 2. Prepare Collision data

### 1. Collect data

- Collision data – Point file ●●●

2010-2014



Collisions not on  
state highway



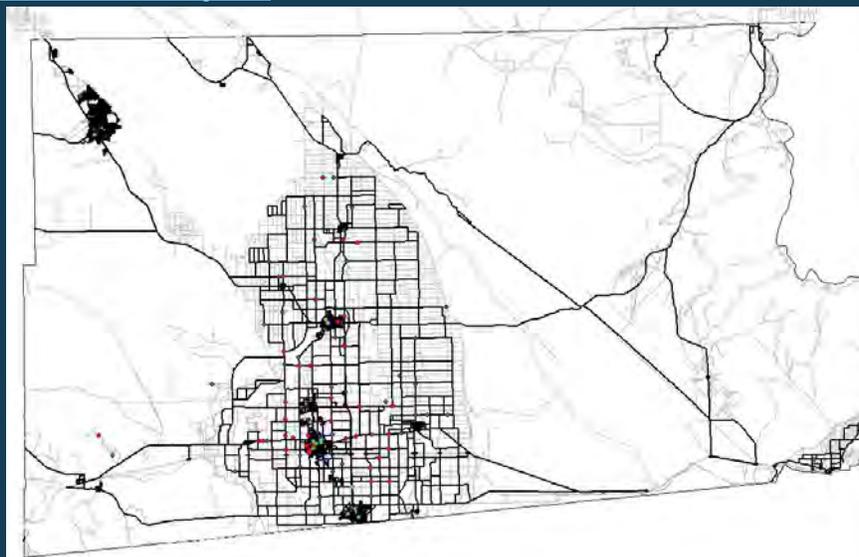
All Fatal and Serious Injury FSI  
Auto – Auto  
Auto – Pedestrian  
Auto – Bike

Data source: SWITRS, TIMS

## 2. Prepare Collision data – Select and Export

### GIS tool : Select and Export

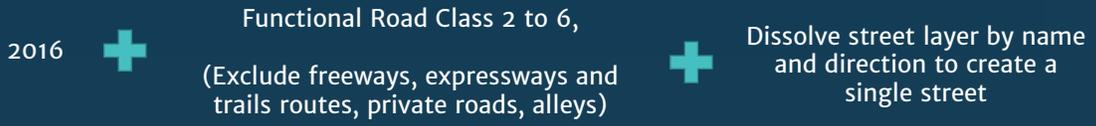
- FSI
- Ped
- Bike
- Auto



### 3. Prepare Street line data –Select and Export

#### 1. Collect data

- Street network data – line file (TomTom) \_\_\_\_\_



Data : Tiger line shape file , North America detailed streets (ESRI)

### 3. Prepare Street line data - Dissolve

GIS tool : Dissolve

The screenshot shows a GIS application interface. The top part displays a map of a street network with a specific street highlighted in cyan. Below the map is a data table with the following columns: OBJECTID\*, ID, FATTYP, FT, F\_JRCTID, F\_JRCTYP, T\_JRCTID, T\_JRCTYP, PJ, METERS, FRC, METCLASS, METCLASS, METCLASS, NAME, BAMELC, SOL, BAMEYTP, CHARGE, and SHIELDNUM. The table contains several rows of data, with the first row highlighted in cyan.

OBJECTID*	ID	FATTYP	FT	F_JRCTID	F_JRCTYP	T_JRCTID	T_JRCTYP	PJ	METERS	FRC	METCLASS	METCLASS	METCLASS	NAME	BAMELC	SOL	BAMEYTP	CHARGE	SHIELDNUM
814400	6840002094932	4110	0	68400020645502	0	68400020619599	0	0	238.75	4	0	0	0	2 W 9th Ave	ENGL	0	0	0	17
795428	68400020371905	4110	0	684000203784963	0	684000203784958	0	0	312.84	4	0	0	0	2 W 9th Ave	ENGL	0	0	0	17
960539	68400020322901	4110	0	684000203283372	0	684000203180562	0	0	67.87	4	0	0	0	2 W 9th Ave	ENGL	0	0	0	17
988558	68400020345802	4110	0	68400020611989	0	684000205112175	0	0	80.02	4	0	0	0	2 W 9th Ave	ENGL	0	0	0	17
7358912	6840002200662	4110	0	68400020077907	0	68400020644562	0	0	9.76	4	0	0	0	2 W 9th Ave	ENGL	0	0	0	17

### 3. Prepare Street line data - Dissolve



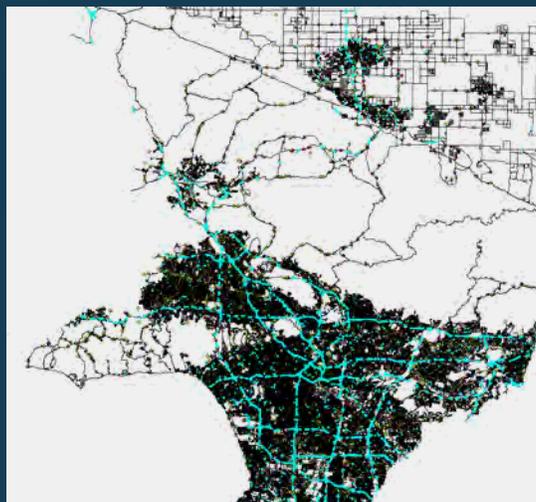
GIS tool : Dissolve

OBJECTID	Shape	NAME	#123M	Shape_Length	Long_m
16	Polyline	120th St		227.1461719	0.170511
29	Polyline	500th St	8	388.182114	0.321151
28	Polyline	1020th St		133.871165	0.001094
39	Polyline	19th St		219.720558	0.13084
12	Polyline	10th St		154.555399	0.000223
42	Polyline	12th St		152.666215	0.110001
83	Polyline	13th St		99.261911	0.081018
81	Polyline	15th St		187.302144	0.120011
81	Polyline	19th St		138.679695	0.089708
60	Polyline	19th St		203.222749	0.126217
187	Polyline	180th St		257.603617	0.169102
146	Polyline	177th St		216.301669	0.132714
128	Polyline	170th St		201.748837	0.120217
150	Polyline	15th Ave		119.949228	0.089913
154	Polyline	180th St		204.424245	0.149206
157	Polyline	180th St SW		208.100846	0.124117
158	Polyline	180th Ave		122.000009	0.073801
168	Polyline	162nd St		305.191611	0.190001
169	Polyline	160th St		199.22226	0.111005
187	Polyline	200th St		172.847484	0.101044
291	Polyline	230th St		184.541891	0.102086
287	Polyline	240th St		206.415171	0.13011
282	Polyline	240th St		302.210212	0.187676
284	Polyline	240th St SW		182.585559	0.101024
311	Polyline	260th St		213.140234	0.134091
312	Polyline	262nd St SW		204.894915	0.127118
314	Polyline	230th St SW		182.646205	0.110201
300	Polyline	300th St		191.618849	0.119217
301	Polyline	300th St E		81.110869	0.047671
303	Polyline	300th St		88.879216	0.052096
304	Polyline	300th St		199.77229	0.125011
309	Polyline	400th St		184.303514	0.110007
382	Polyline	41st St		192.477117	0.119007
385	Polyline	42nd St		193.197111	0.124401
388	Polyline	43rd St		193.679816	0.120204
371	Polyline	44th St		184.205669	0.107676
372	Polyline	44th St SW		216.880036	0.137002

### 3. Prepare Street line data - Challenges



GIS tool : Edit & Delete



## 4. Assign Collision to Street network

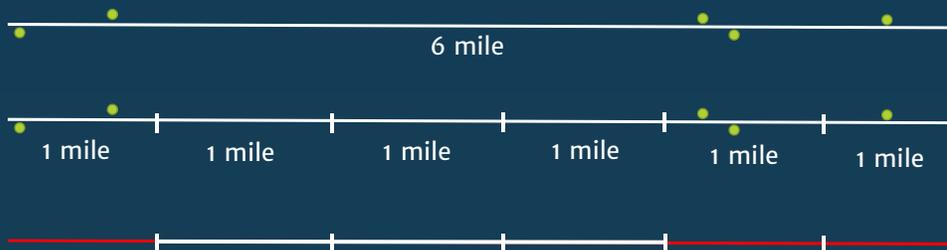
GIS tool : Near

— FSI HIN



## 4. Assign Collision to Street network

GIS tool : Near



Collision ●  
Street —  
HIN —

## Results



<i>Maximum number of Collisions per mile</i>				
	<i>FSI</i>	<i>Auto</i>	<i>Ped</i>	<i>Bike</i>
<i>Imperial</i>	3	2	1	1
<i>LA</i>	14	7	9	5
<i>Orange</i>	13	4	4	4
<i>SB</i>	8	4	3	2
<i>Riverside</i>	10	6	4	2
<i>Ventura</i>	7	5	5	3

## Threshold

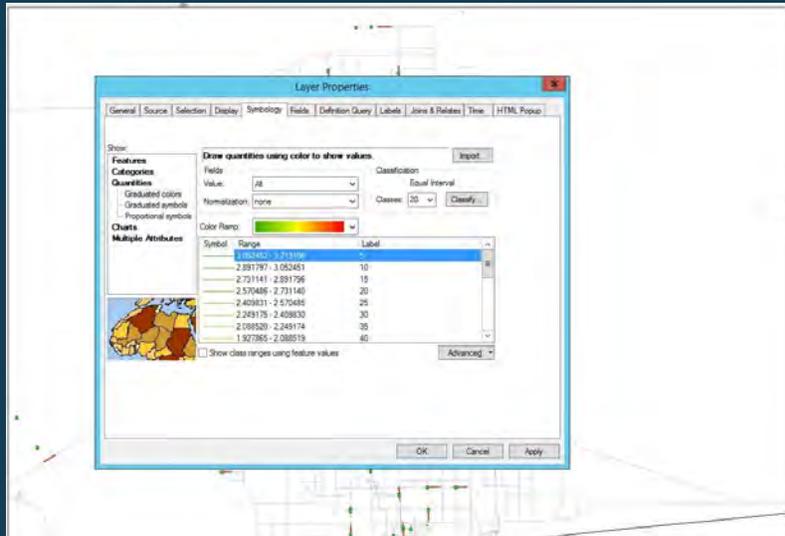


- Identify a subset of streets where at least >50% collisions occur.
- San Francisco 70%
- Los Angeles 65%
- Oregon Metro 60%
- Portland City Top 30

## 4. Assign Collision to Street network



### GIS tool : Symbology



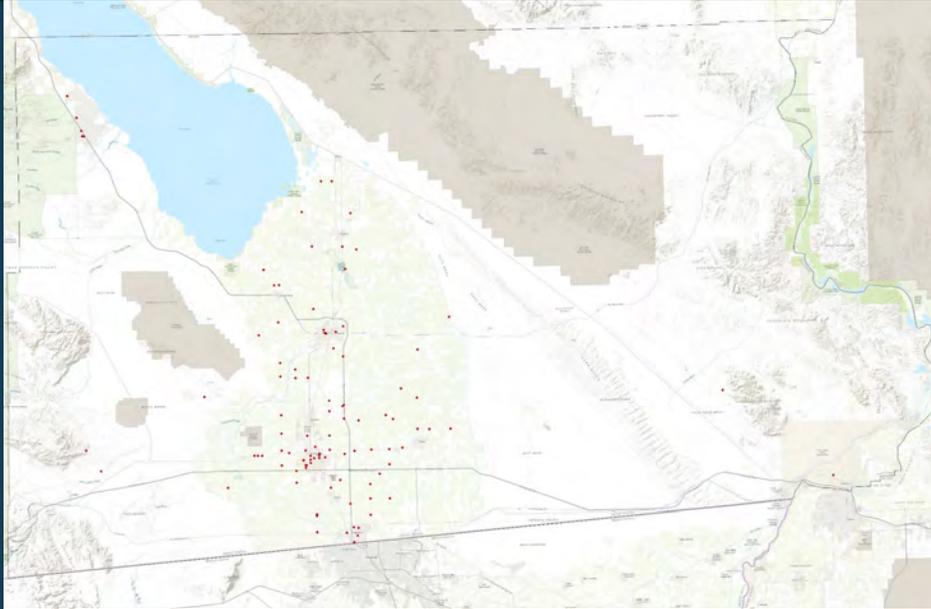
## Threshold



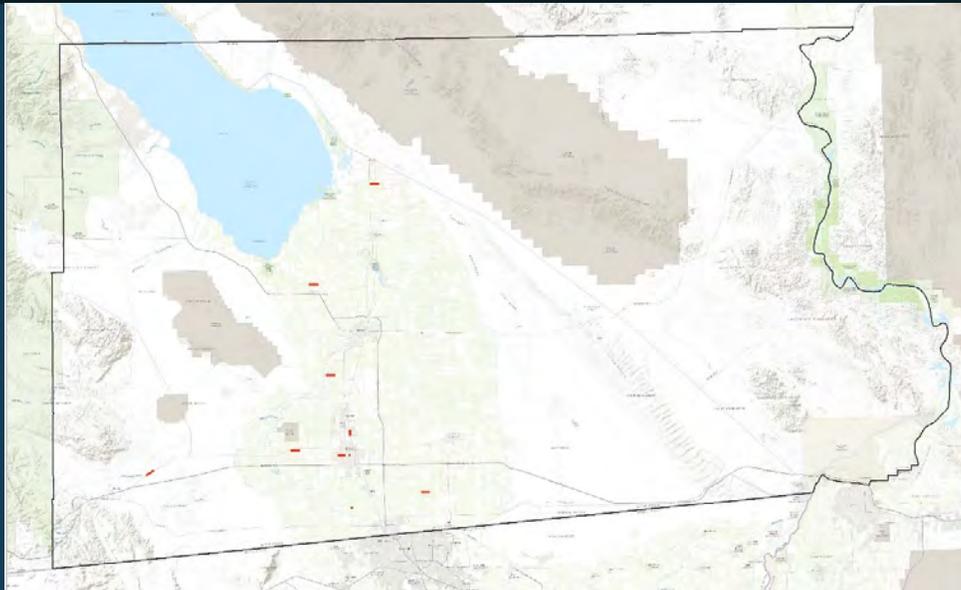
Calculation for % street miles

	Total Roadway Miles	HIN roadway miles 60%	60%	HIN roadway miles 65%	65%	HIN roadway miles 70%	70%	HIN roadway miles 75%	75%	HIN roadway miles 80%	80%
<b>Imperial</b>	1693.5 miles	7.9 miles	<b>0.47%</b>	7.9 miles	<b>0.47%</b>	95.5 miles	<b>5.64%</b>	95.5 miles	<b>5.64%</b>	95.5 miles	<b>5.64%</b>
<b>LA</b>	16845.9 miles	180.4 miles	<b>1.07%</b>	314.0 miles	<b>1.86%</b>	314.0 miles	<b>1.86%</b>	563.4 miles	<b>3.34%</b>	1029.6 miles	<b>6.11%</b>
<b>Orange</b>	3885.8 miles	14.1 miles	<b>0.36%</b>	32.3 miles	<b>0.83%</b>	85.6 miles	<b>2.20%</b>	85.6 miles	<b>2.20%</b>	227.6 miles	<b>5.86%</b>
<b>SB</b>	9103.7 miles	36.7 miles	<b>0.40%</b>	85.0 miles	<b>0.93%</b>	85.0 miles	<b>0.93%</b>	266.9 miles	<b>2.93%</b>	266.9 miles	<b>2.93%</b>
<b>Riverside</b>	6225.6 miles	17.8 miles	<b>0.29%</b>	45.0 miles	<b>0.72%</b>	120.5 miles	<b>1.94%</b>	120.5 miles	<b>1.94%</b>	120.5 miles	<b>1.94%</b>
<b>Ventura</b>	1653.2 miles	46.5 miles	<b>2.82%</b>	46.5 miles	<b>2.82%</b>	46.5 miles	<b>2.82%</b>	152.2 miles	<b>9.21%</b>	152.2 miles	<b>9.21%</b>

## Imperial County – All FSI Collisions

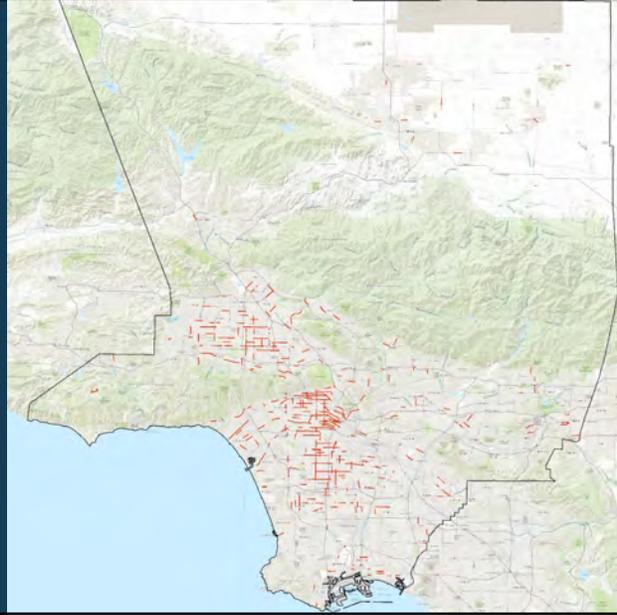
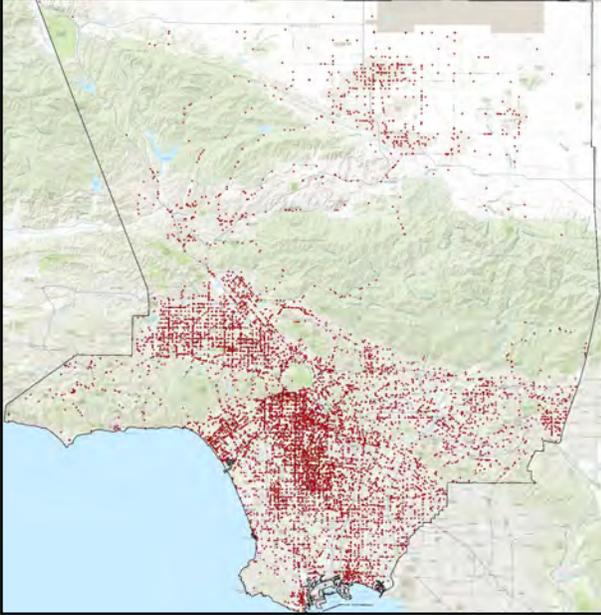


## Imperial County - HIN



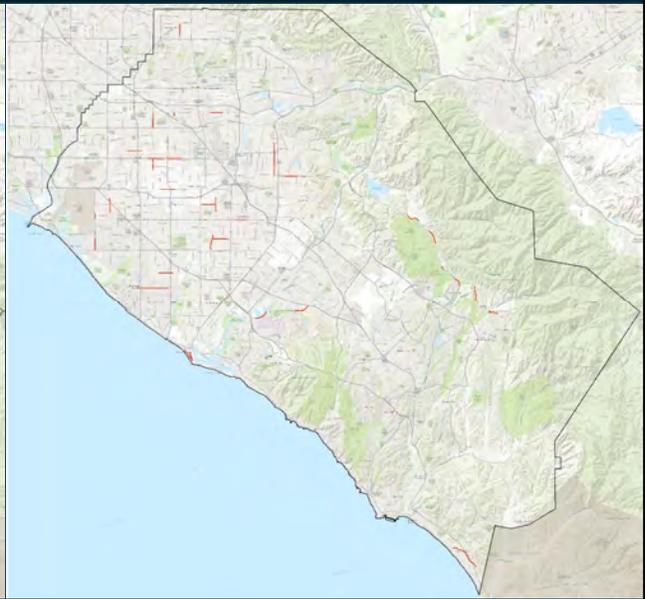
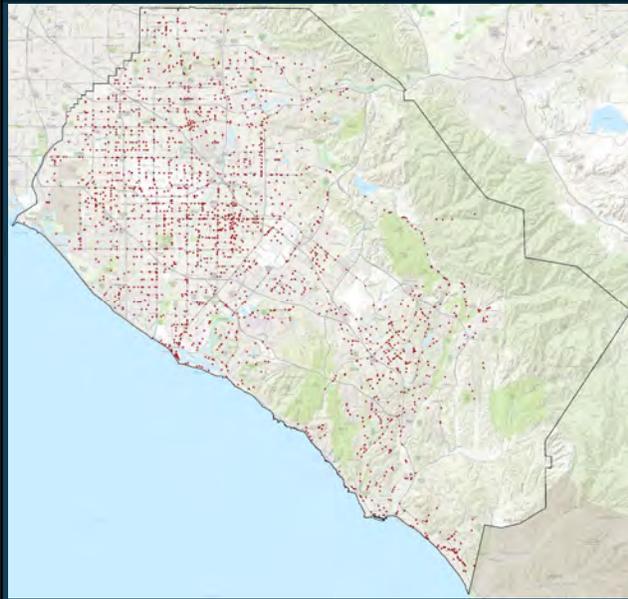
**Los Angeles County-All FSI**

**Los Angeles County - HIN**

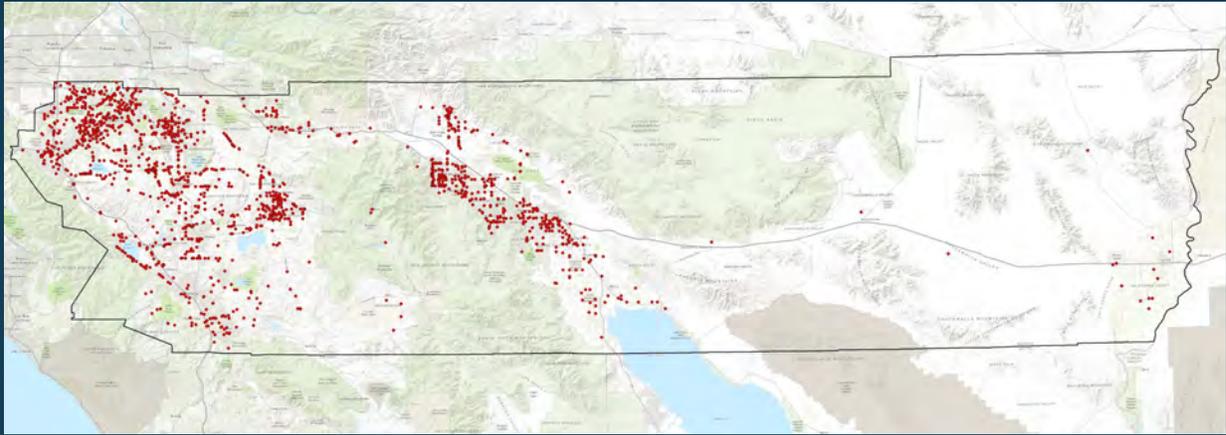


**Orange County-All FSI Collisions**

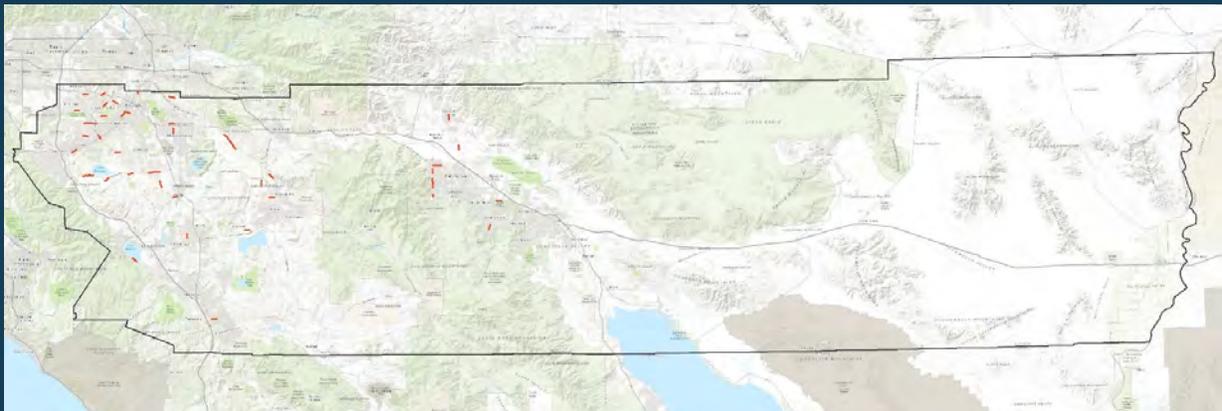
**Orange County - HIN**



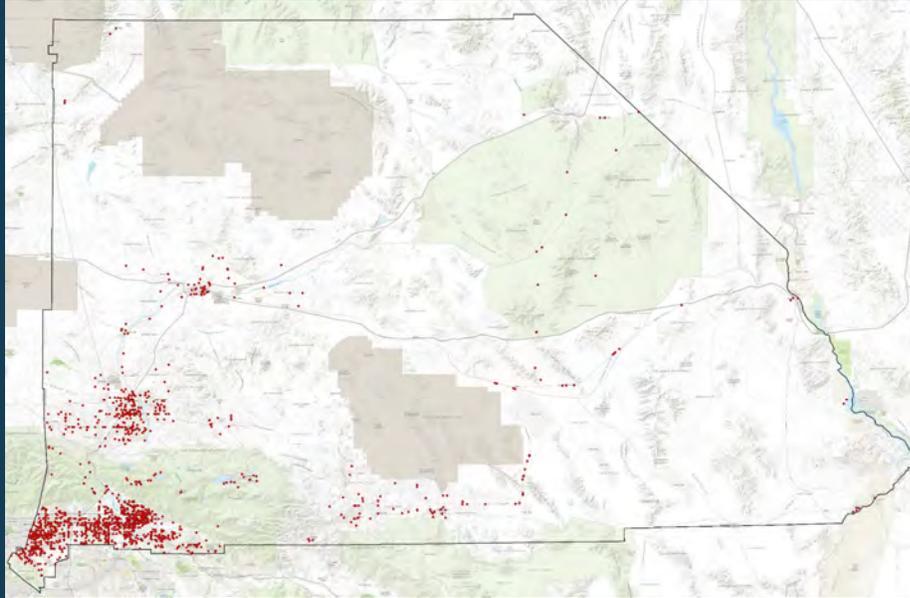
## Riverside County - All FSI Collisions



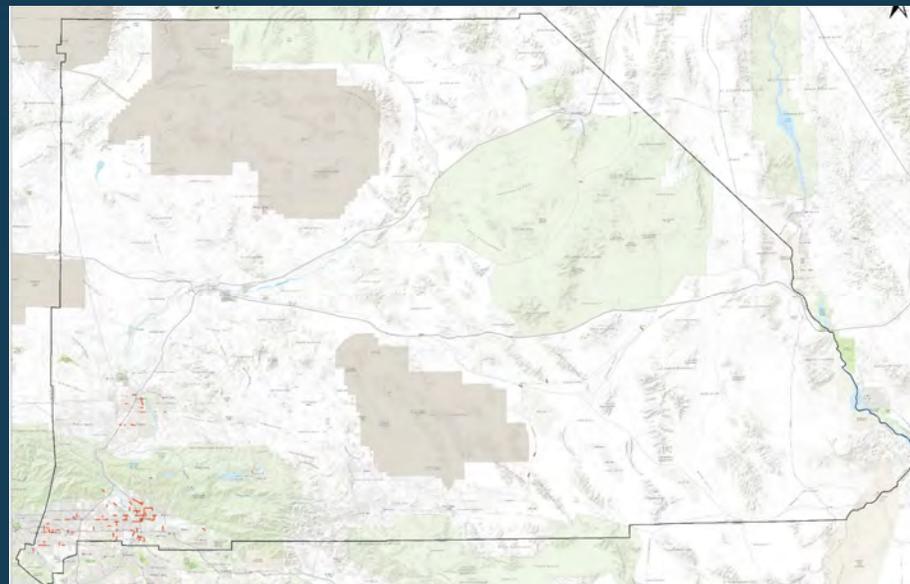
## Riverside County - HIN



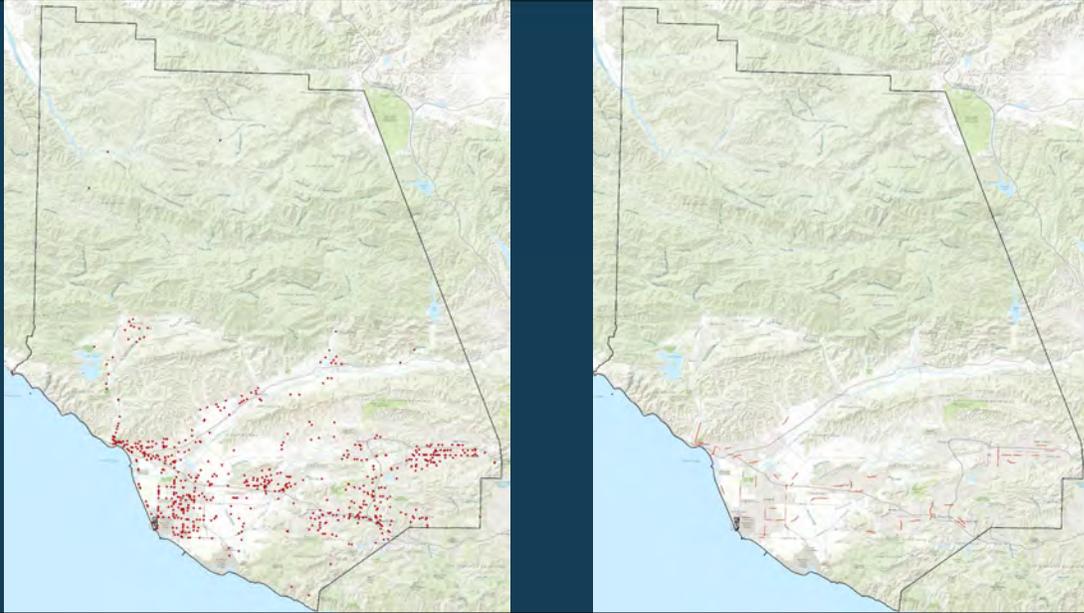
## San Bernardino County – All FSI Collisions



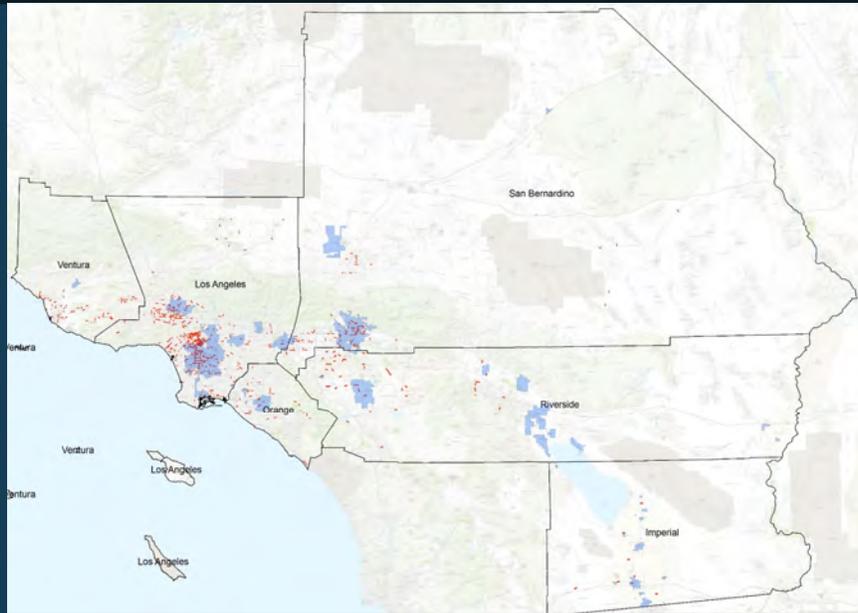
## San Bernardino County - HIN



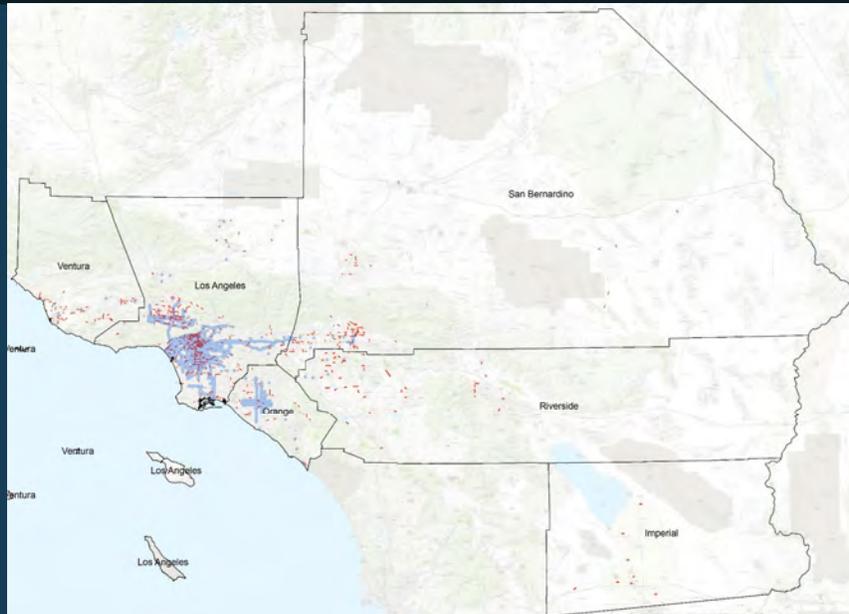
# Ventura County-All FSI Collisions Ventura County – HIN



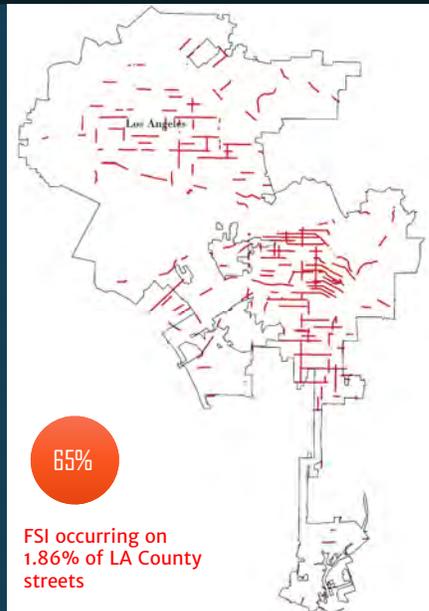
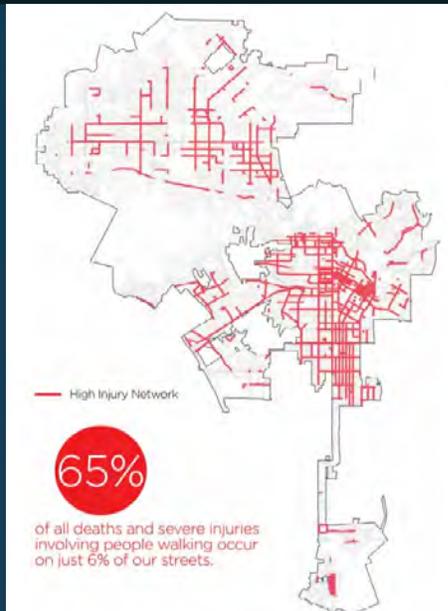
# Communities of Concern Overlay



## High Quality Transit Area (HQTA) Overlay



## Comparing LA City vs LA County HIN





Questions?

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