

Appendix A: Reported Pedestrian Crash Density Using Square-Mile Grid Mapping

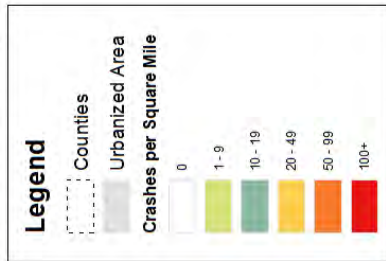
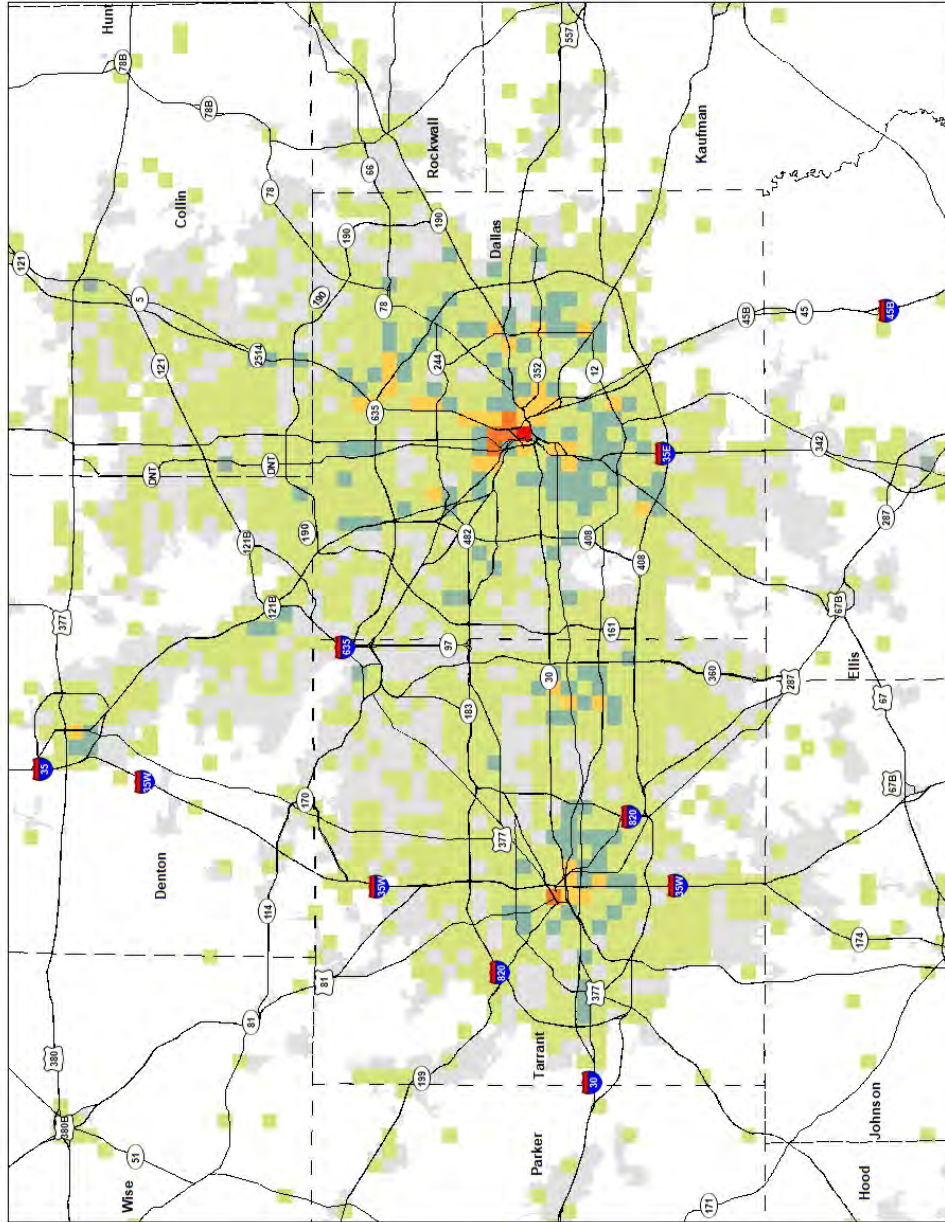
Identifying the density of reported pedestrian crash locations involved the grid mapping process as outlined in this appendix. A square-mile grid was developed in ArcGIS and overlaid upon the 12-county region map that contained the crash points (locations) of pedestrian crashes reported between 2014-2018. The number of crash points within each square-mile area was aggregated and displayed in the center of each “cell” for those counties whose cells contained more than 10 reported crashes. For those counties whose cells contained ten or less reported crashes (maximum, including Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, and Wise County), individual crash points were included on the maps. Cells were color-coded, based on the determined range of crash values for each cell, to identify areas with high concentrations of reported crashes more easily. Each county implemented a unique range, in accordance with the scale, area size and number of reported crashes. Ranges were tailored for readability in easily identifying high crash density areas. Crashes involving pedestrian fatalities are denoted by a “star” symbol on the maps; however, as the aim of the PSAP is to reduce overall reported pedestrian crashes, fatal crashes were not given more weight in the mapping process.

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1. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Urbanized Area

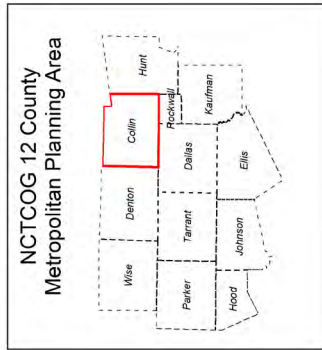
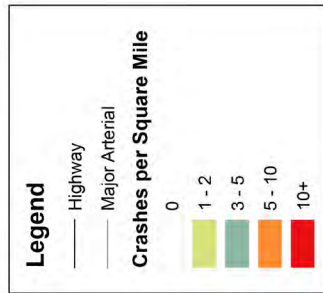
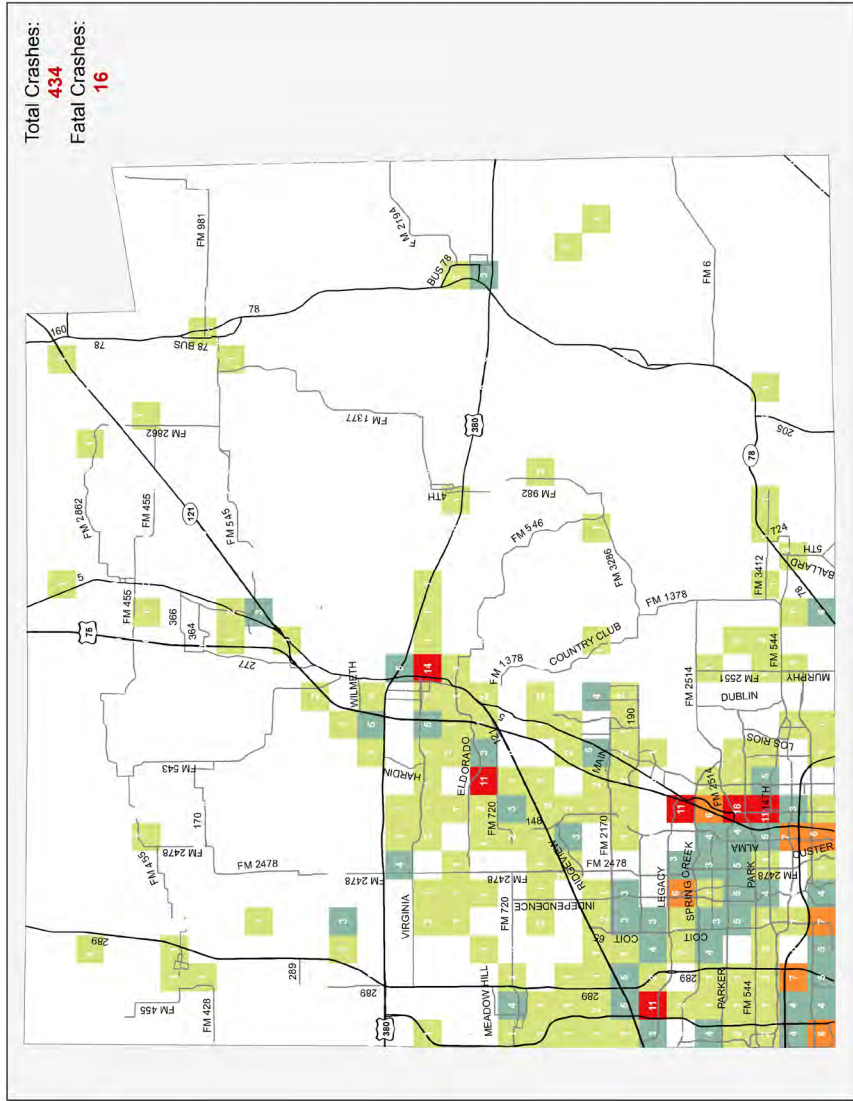
Urbanized Area Pedestrian Crashes per Square Mile (2014 - 2018)



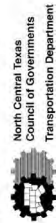
1.) Source: TxDOT's Crash Records Information System - 2014 - 2018 data is current as of January 2019. All TxDOT disclaimers apply.
 2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
 3.) This data is composed of TxDOT "Reportable Crashes" that occurs or originates on a traffic way, results in injury to or death of any person, or damage to the property of any person to the apparent extent of \$1,000.

2. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Collin County

Collin County Pedestrian Crashes per Square Mile (2014 - 2018)



1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
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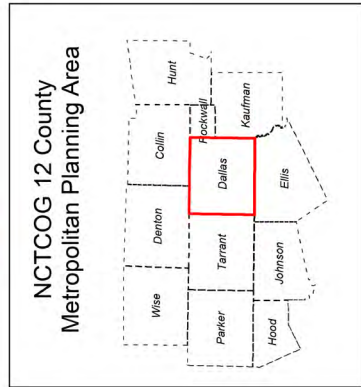
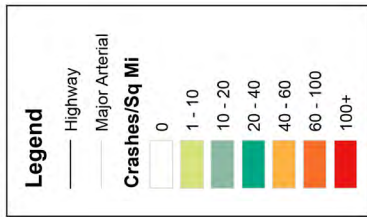
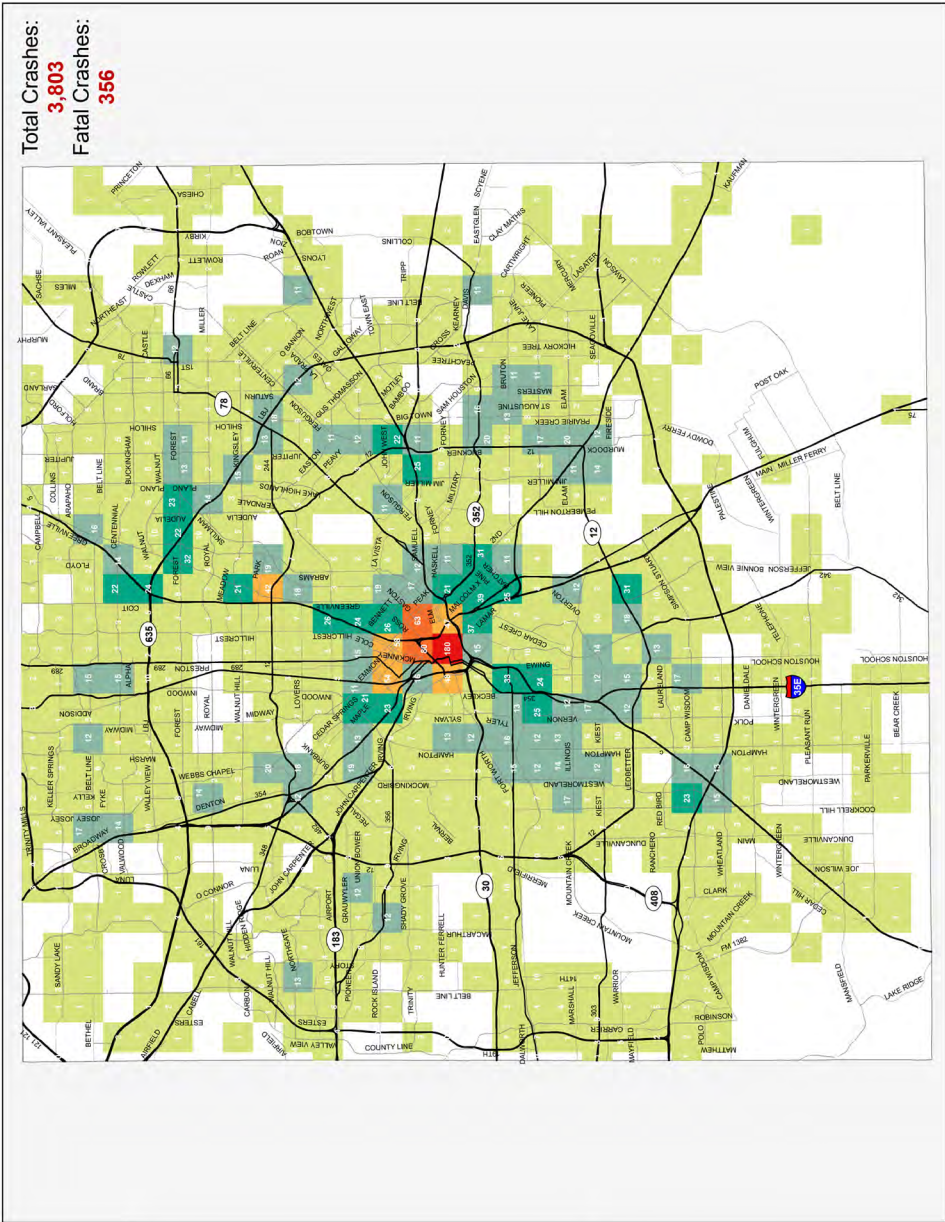
0 5 10 Miles

Date: 1/14/2021

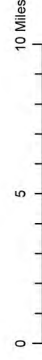
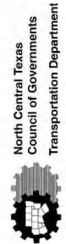
3. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Dallas County

Dallas County

Pedestrian Crashes per Square Mile (2014 - 2018)



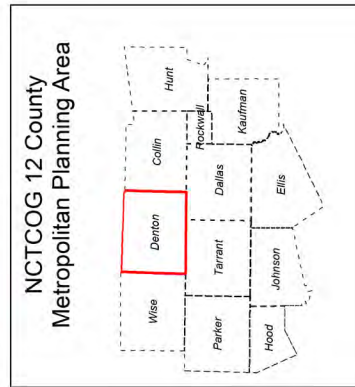
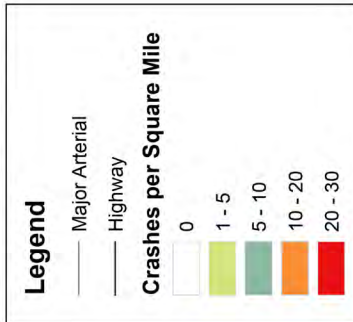
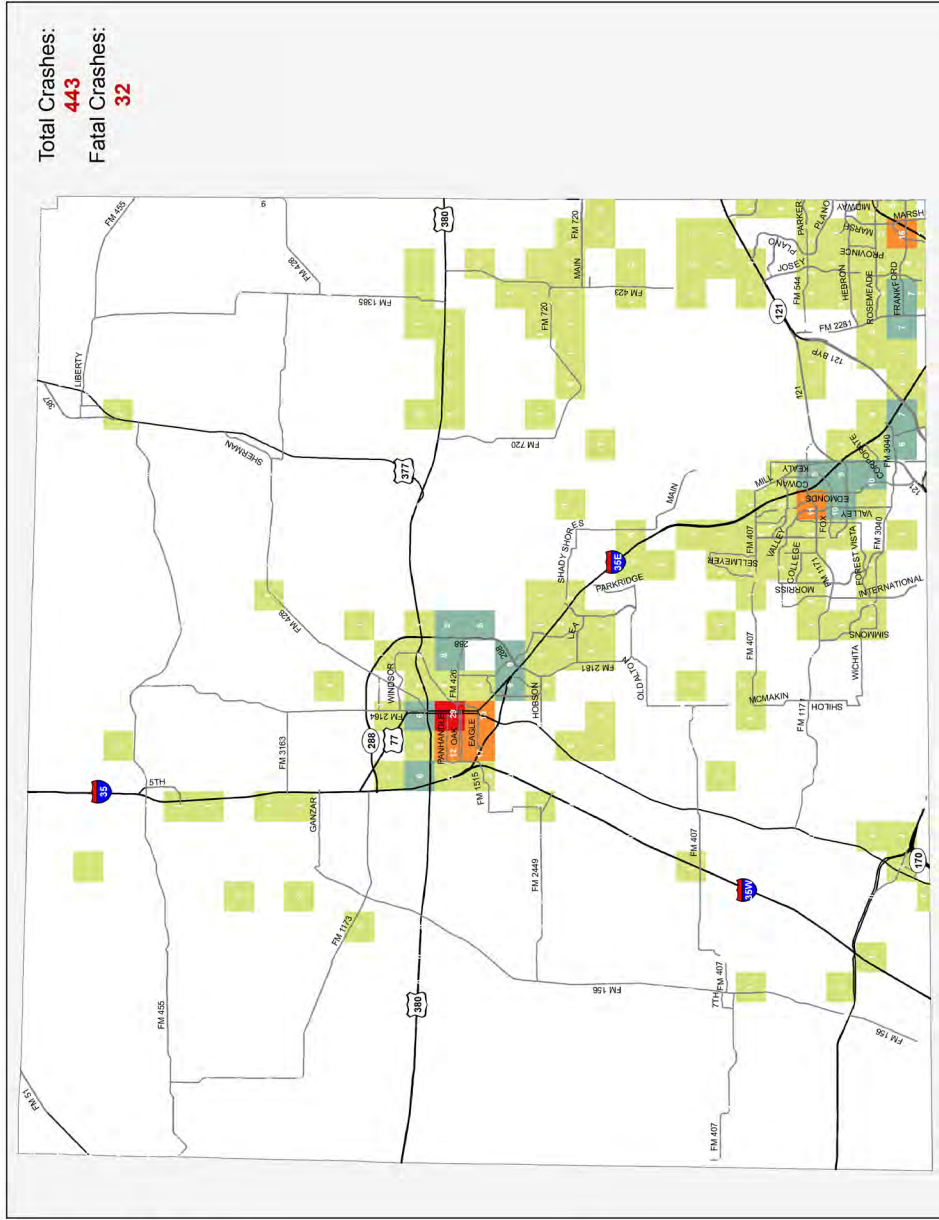
1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
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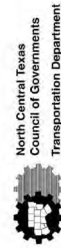
4. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Denton County

Denton County

Pedestrian Crashes per Square Mile (2014 - 2018)

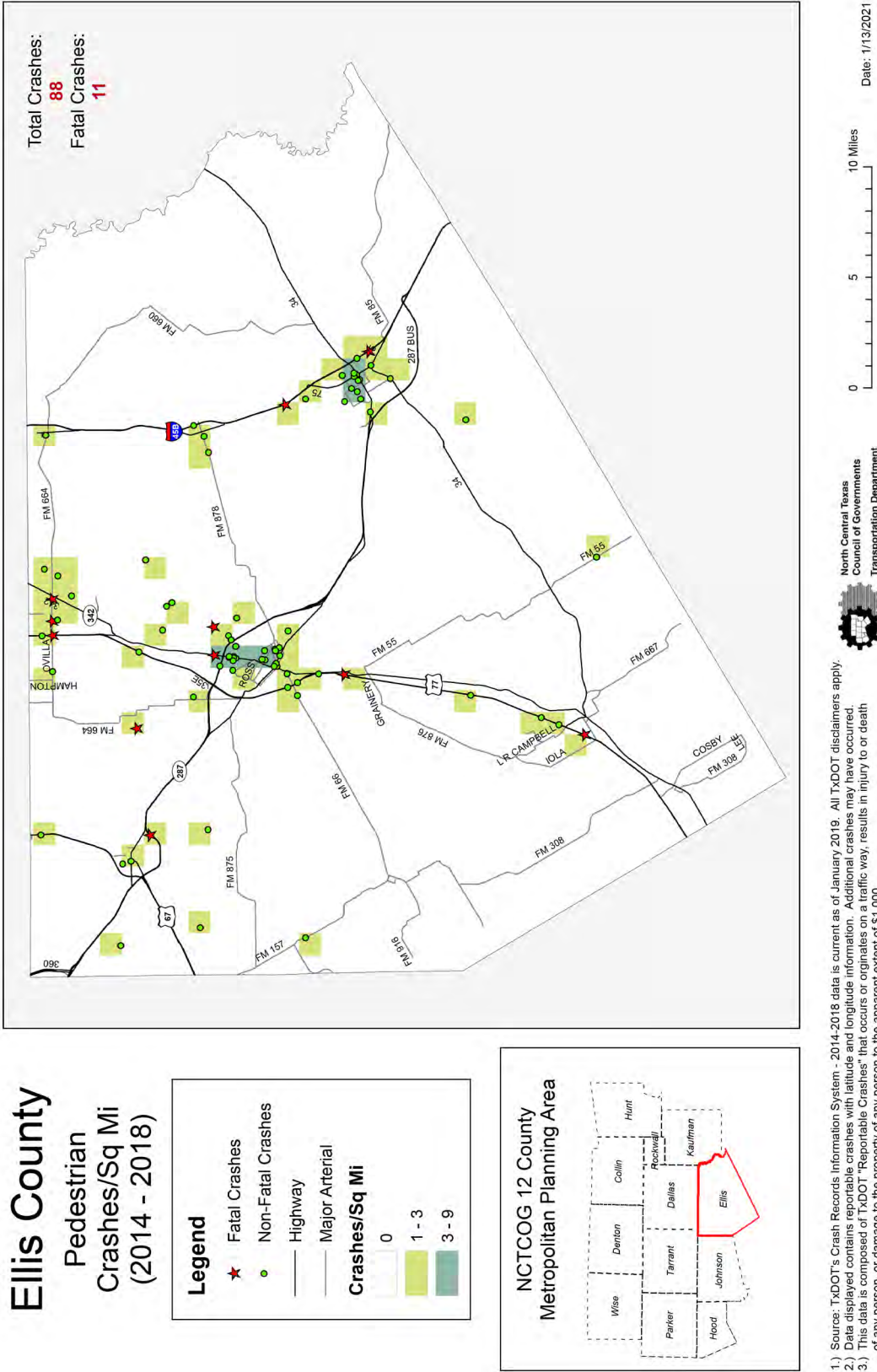


1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
 2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
 3.) This data is composed of TxDOT "Reportable Crashes" that occurs or originates on a traffic way, results in injury to or death of any person, or damage to the property of any person to the apparent extent of \$1,000.



Date: 1/14/2021

5. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Ellis County

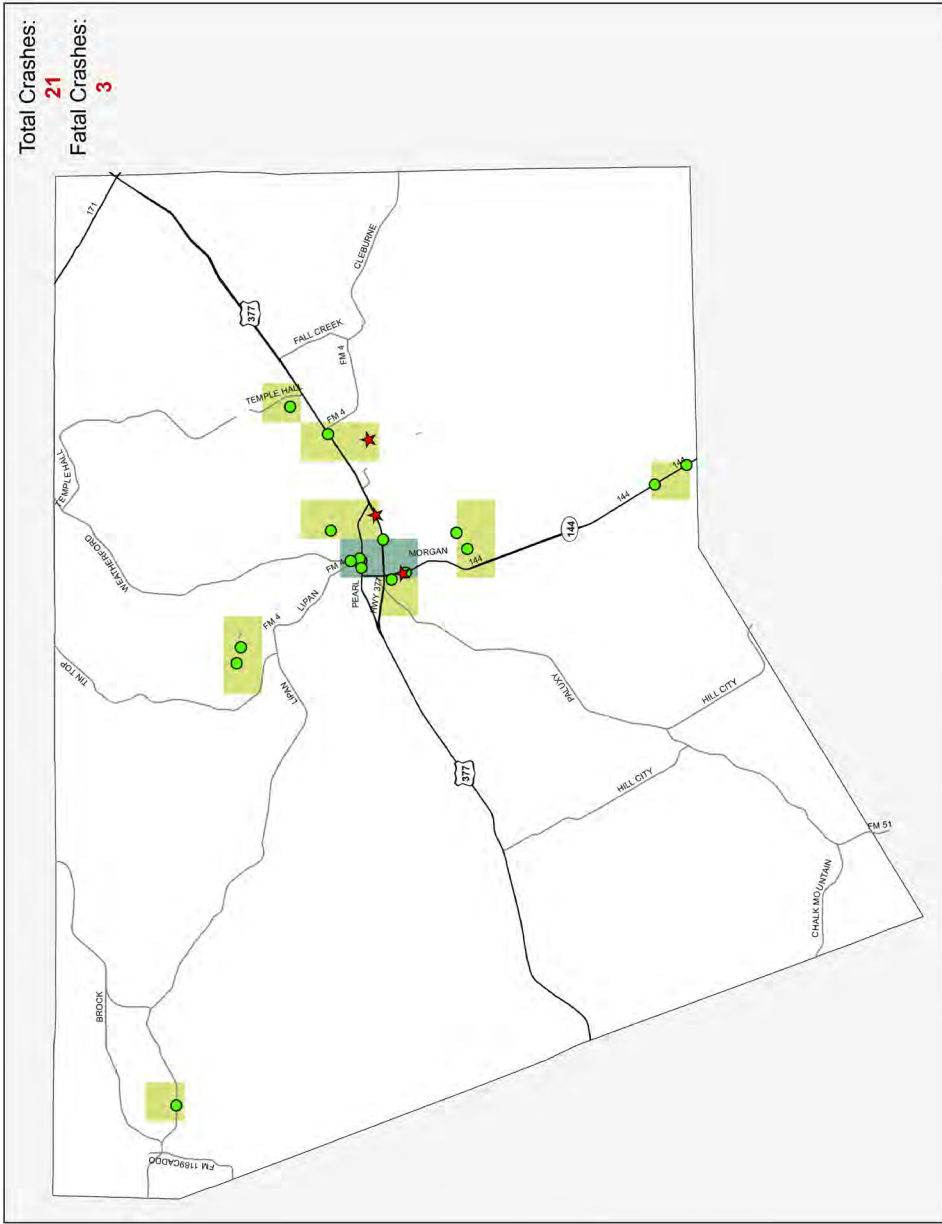


1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
 2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
 3.) This data is composed of TxDOT "Reportable Crashes" that occurs or originates on a traffic way, results in injury to or death of any person, or damage to the property of any person to the apparent extent of \$1,000.

6. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Hood County

Hood County

Pedestrian Crashes per Square Mile (2014 - 2018)

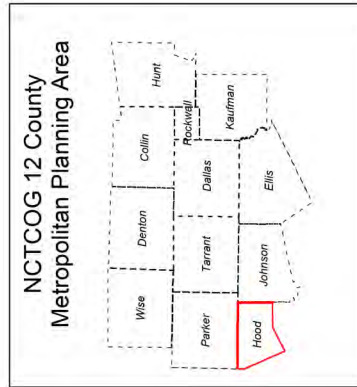


Legend

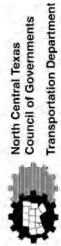
- ★ Fatal Crashes
- Non-Fatal Crashes
- Highway
- Major Arterial

Crashes per Square Mile

- 0
- 1 - 2
- 3 - 5



1.) Source: TXDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TXDOT disclaimers apply.
 2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
 3.) This data is composed of TXDOT "Reportable Crashes" that occurs or originates on a traffic way, results in injury to or death of any person, or damage to the property of any person to the apparent extent of \$1,000.



0 2.5 5 Miles

Date: 1/12/2021

7. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Hunt County

Hunt County

Pedestrian Crashes per Square Mile (2014 - 2018)

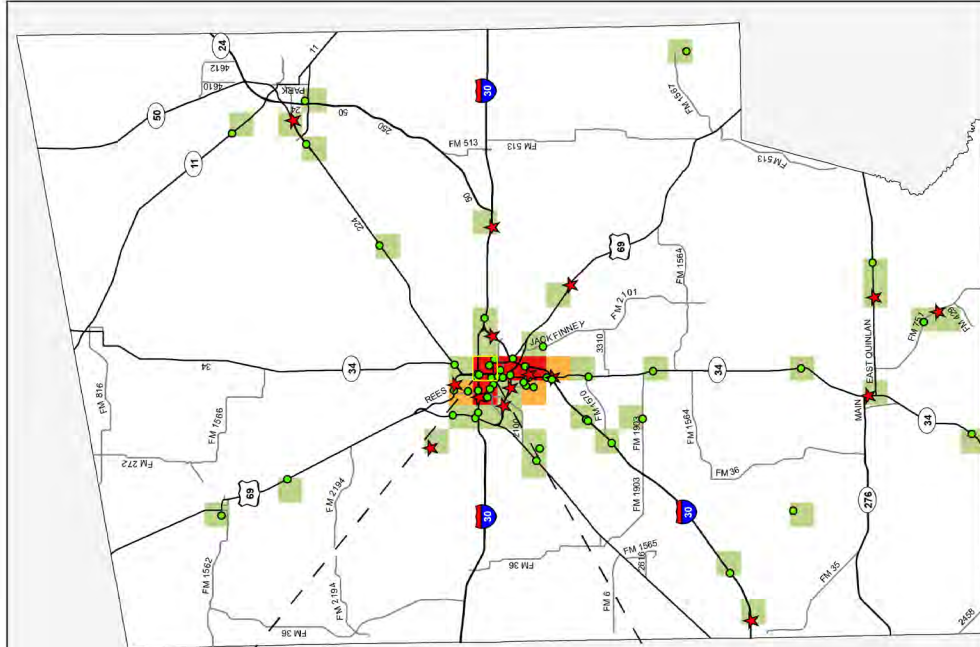
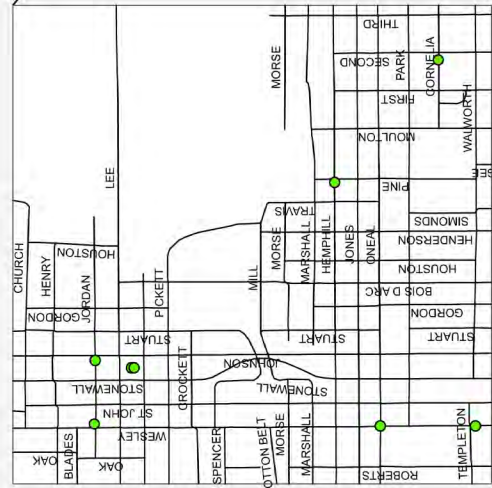
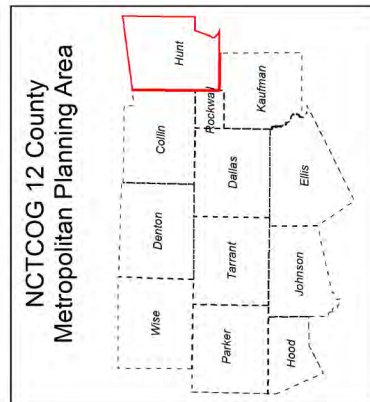
Total Crashes: **73**
 Fatal Crashes: **15**

Legend

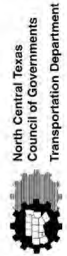
- ★ Fatal Crashes
- Non-Fatal Crashes
- Highway
- Major Arterial

Crashes per Square Mile

0
1 - 2
3 - 5
5 - 10



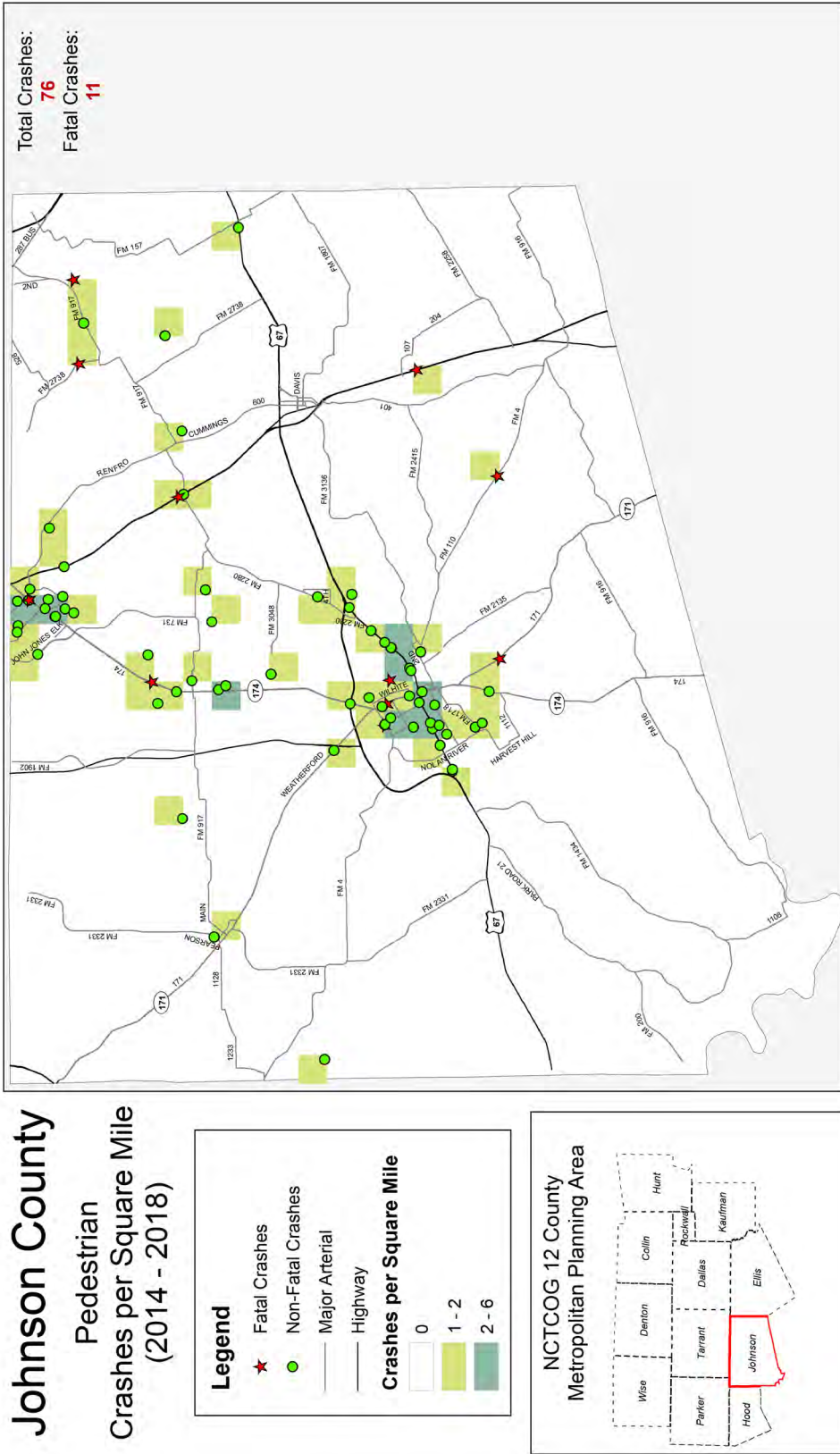
1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
 2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
 3.) This data is composed of TxDOT "Reportable Crashes" that occurs or originates on a traffic way, results in injury to or death of any person, or damage to the property of any person to the apparent extent of \$1,000.



0 5 10 Miles

Date: 1/13/2021

8. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Johnson County

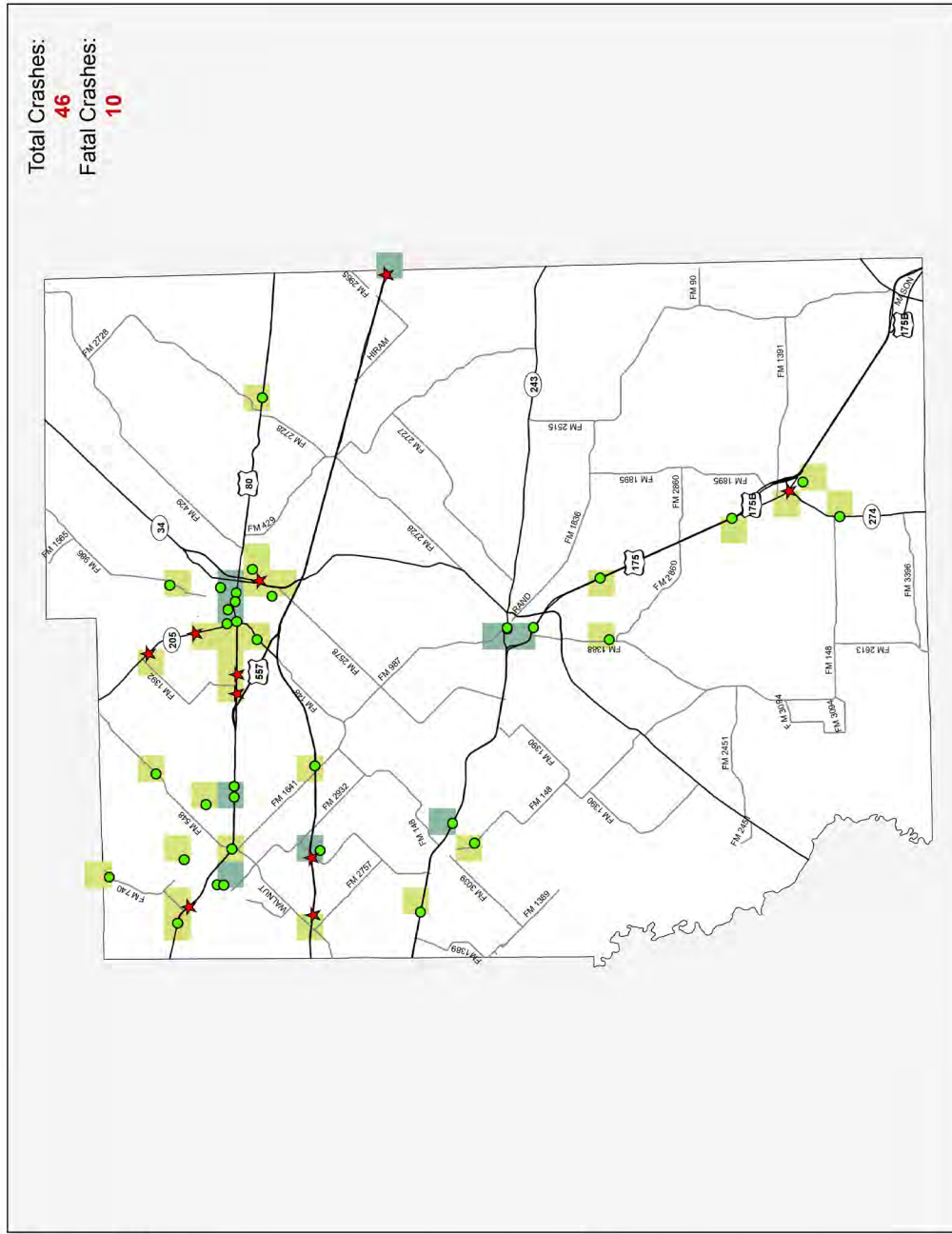


1.) Source: TXDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TXDOT disclaimers apply.
 2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
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9. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Kaufman County

Kaufman County

Pedestrian Crashes per Square Mile (2014 - 2018)



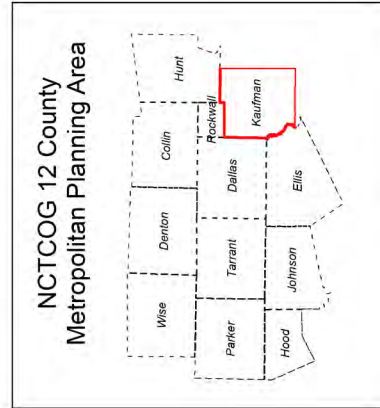
Total Crashes: **46**
 Fatal Crashes: **10**

Legend

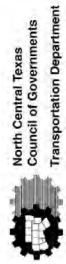
- ★ Fatal Crashes
- Non-Fatal Crashes
- Highway
- - - Major Arterial

Crashes per Square Mile

- 0
- 1
- 2 - 4



1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
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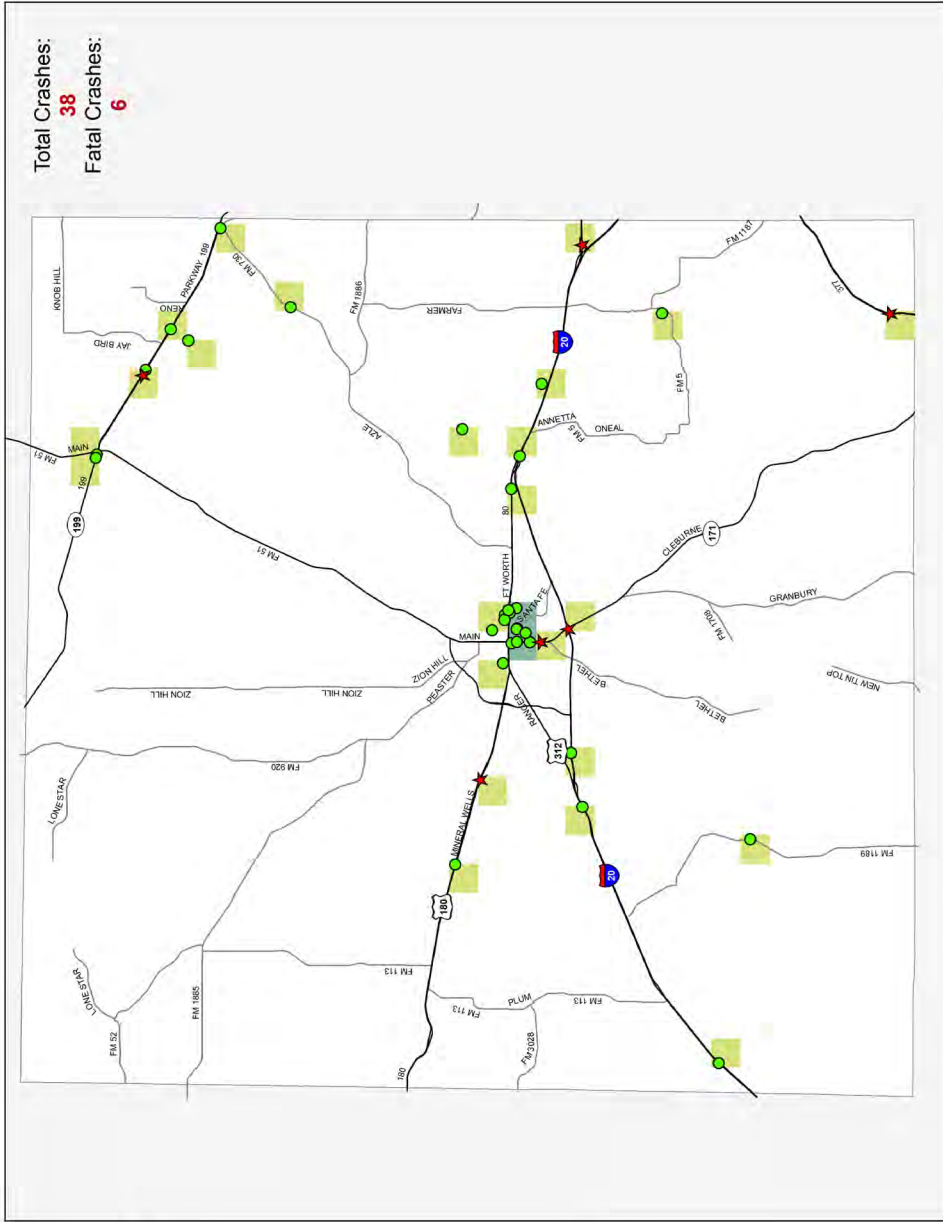
0 5 10 Miles

Date: 1/14/2021

10. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Parker County

Parker County

Pedestrian Crashes per Square Mile (2014 - 2018)

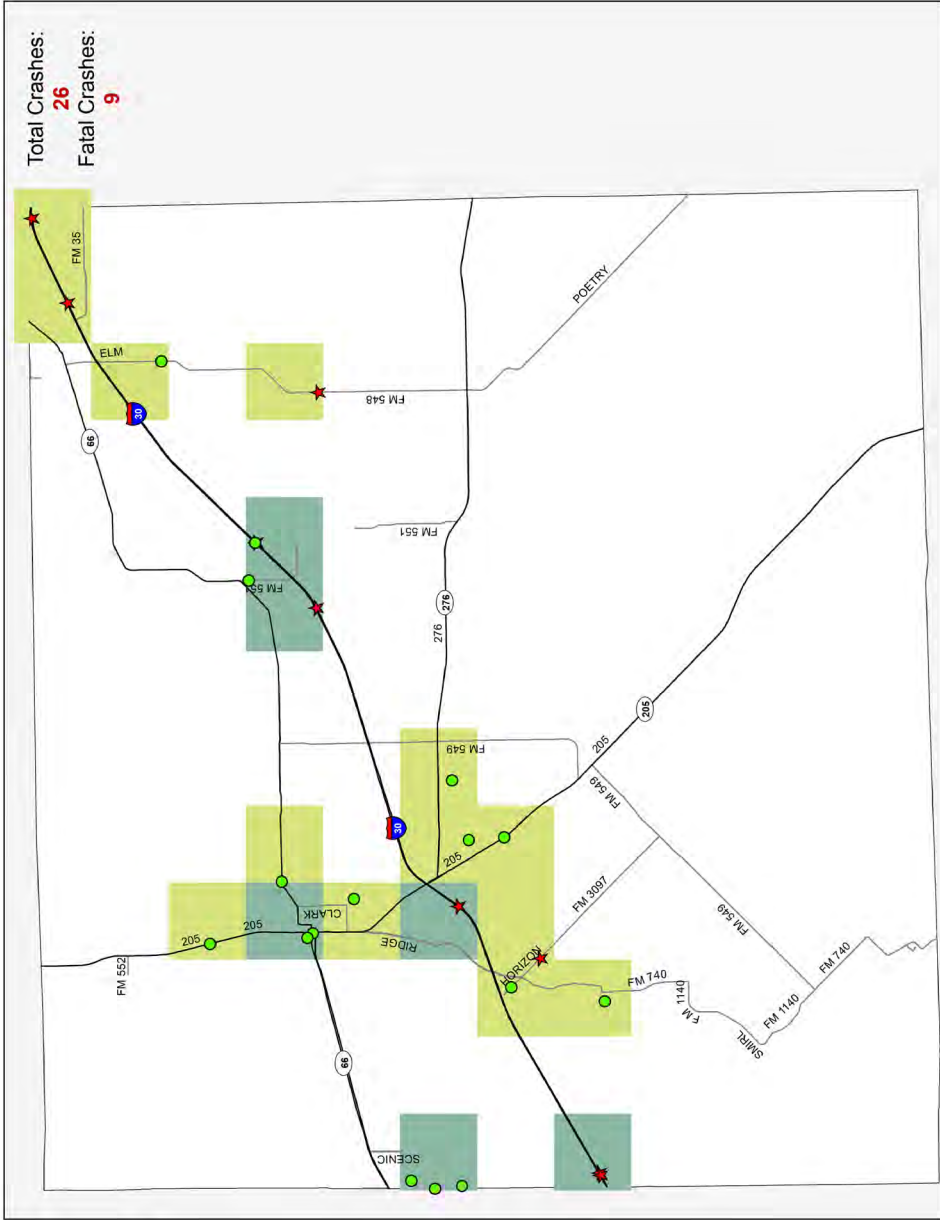


1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
 2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
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11. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Rockwall County

Rockwall County

Pedestrian Crashes per Square Mile (2014 - 2018)

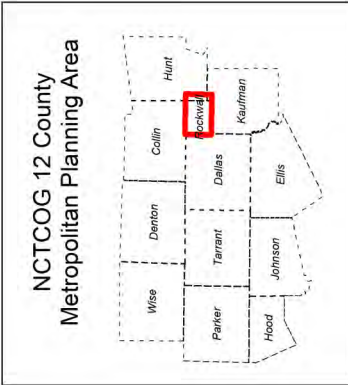


Legend

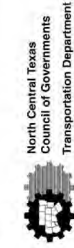
- ★ Fatal Crashes
- Non-Fatal Crashes
- Highway
- Major Arterial

Crashes per Square Mile

- 0
- 1
- 2 - 3



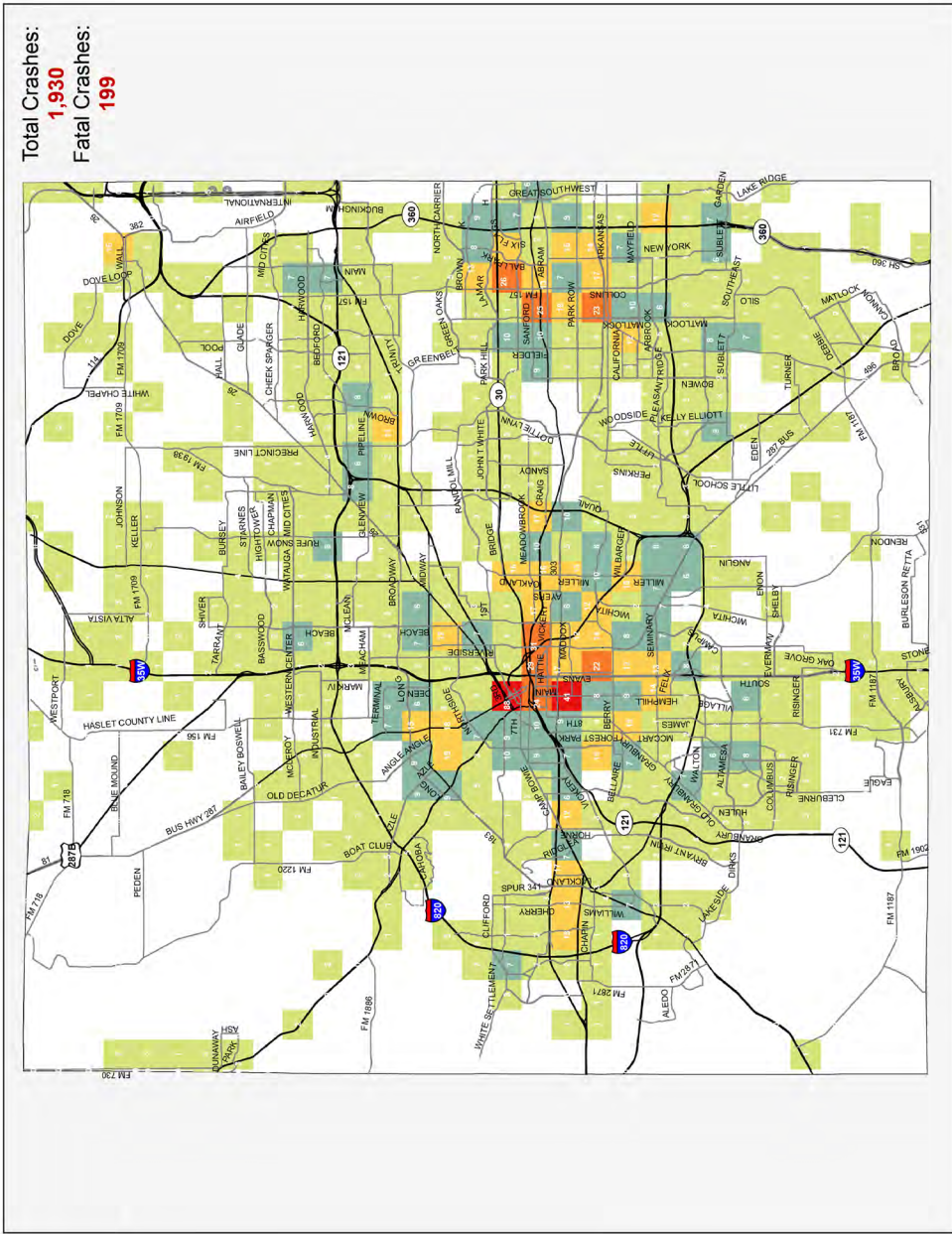
1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
 2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
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Date: 1/14/2021

12. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Tarrant County

Tarrant County Pedestrian Crashes per Square Mile (2014 - 2018)

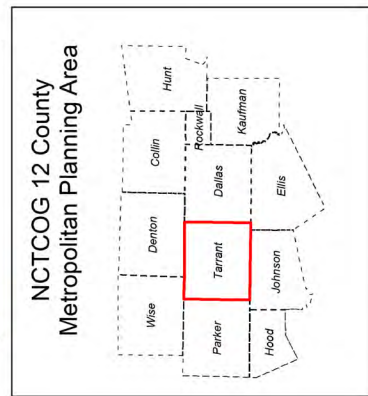


Legend

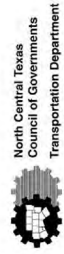
- Major Arterials
- Highway

Crashes per Square Mile

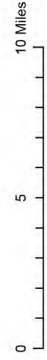
0
1 - 5
5 - 10
10 - 20
20 - 40
60+



1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
 2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
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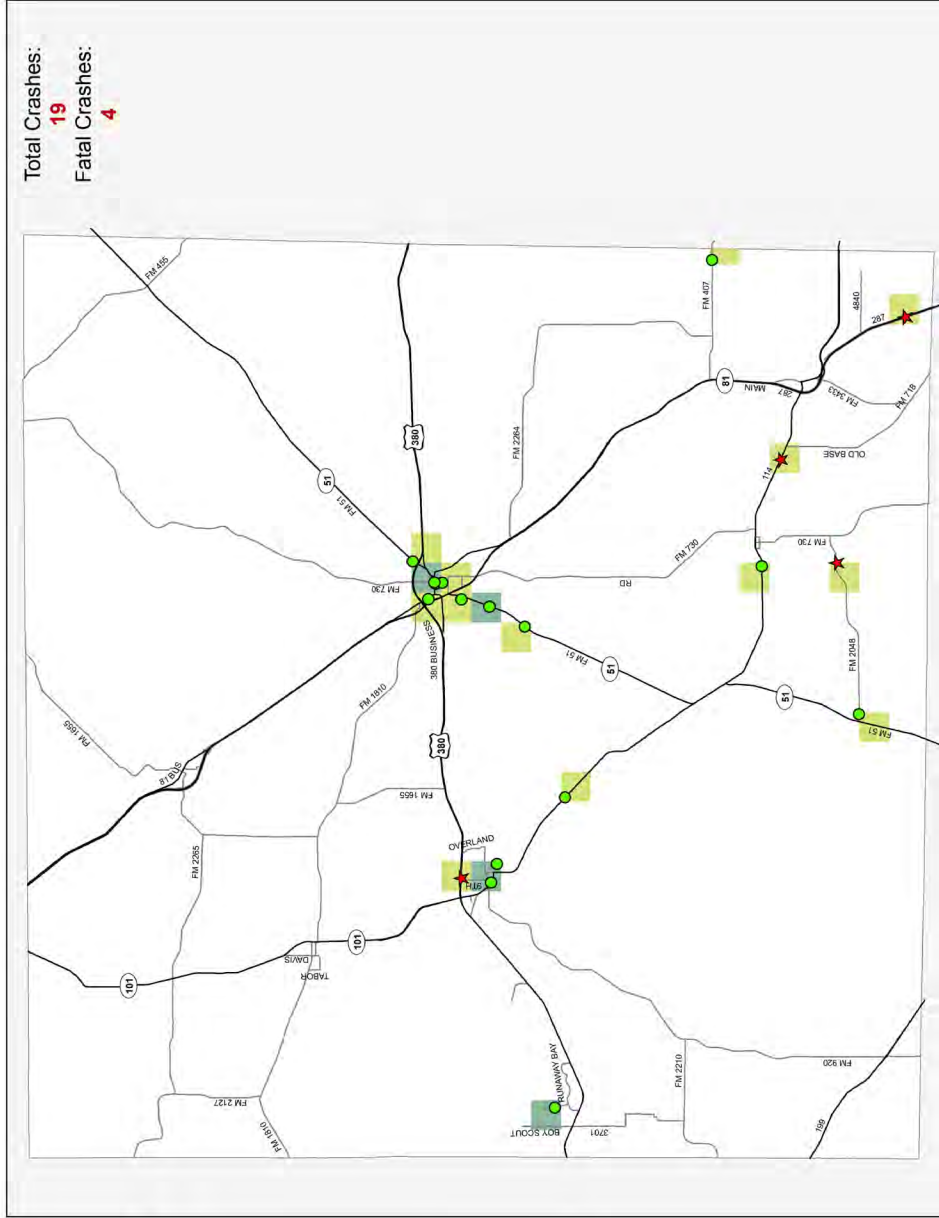


Date: 1/13/2021

13. Grid Map: Pedestrian Crashes Per Square-Mile (2014-2018): Wise County

Wise County

Pedestrian Crashes per Square Mile (2014 - 2018)



Legend

- Fatal Crashes (Red star)
- Non-Fatal Crashes (Green circle)
- Highway (Thick grey line)
- Major Arterial (Thin grey line)

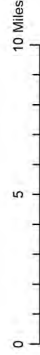
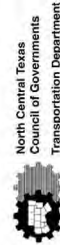
Crashes per Square Mile

- 0 (White)
- 1 (Light Green)
- 2 (Dark Green)

NCTCOG 12 County Metropolitan Planning Area

Wise, Denton, Collin, Hunt, Rockwall, Kaufman, Parker, Tarrant, Dallas, Ellis, Hood, Johnson

1.) Source: TxDOT's Crash Records Information System - 2014-2018 data is current as of January 2019. All TxDOT disclaimers apply.
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Date: 1/14/2021

14. Technical Steps Used in Creating Grid Mapping to Determine Pedestrian Crash Density

Step 1: Determine the density of pedestrian crashes by creating a crash point layer, as derived from Texas Department of Transportation's (TxDOT) reported crashes data. The map should reflect what is seen in Figure 1.

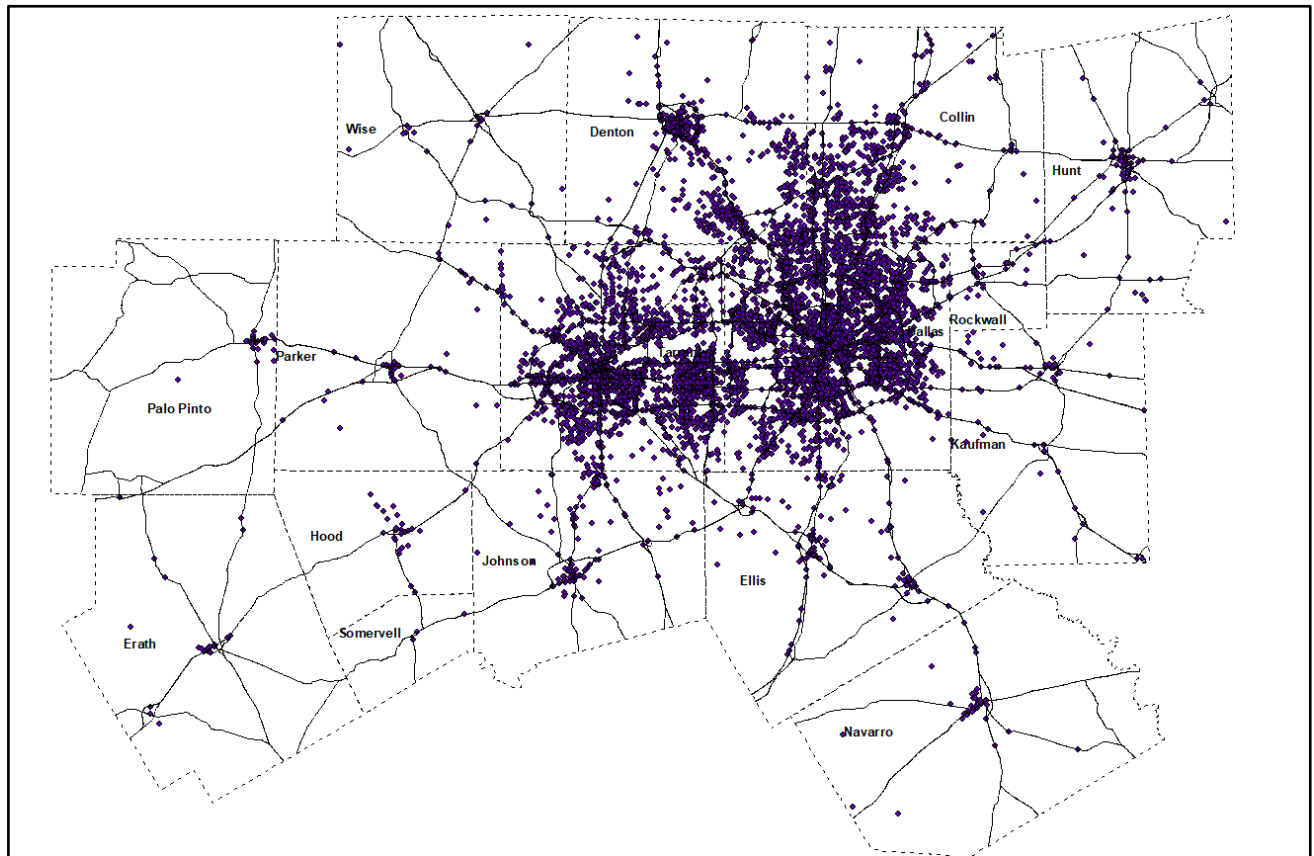


Figure 1: Crash point layer over the regional map.

Step 2: Form a grid using Grid Index Features (Figure 2). As defined by ESRI, a Grid Index Feature is a grid of rectangular polygons that can be used as an index to specify pages for a map book using Data Driven Pages. The PSAP grid spans the 12-county region, with both height and width parameters set to one mile, creating the square-mile grid cells. It must be noted when recreating a Grid Index Feature that its fixed location is dependent on the Coordinate System and boundary set when adjusting parameters.

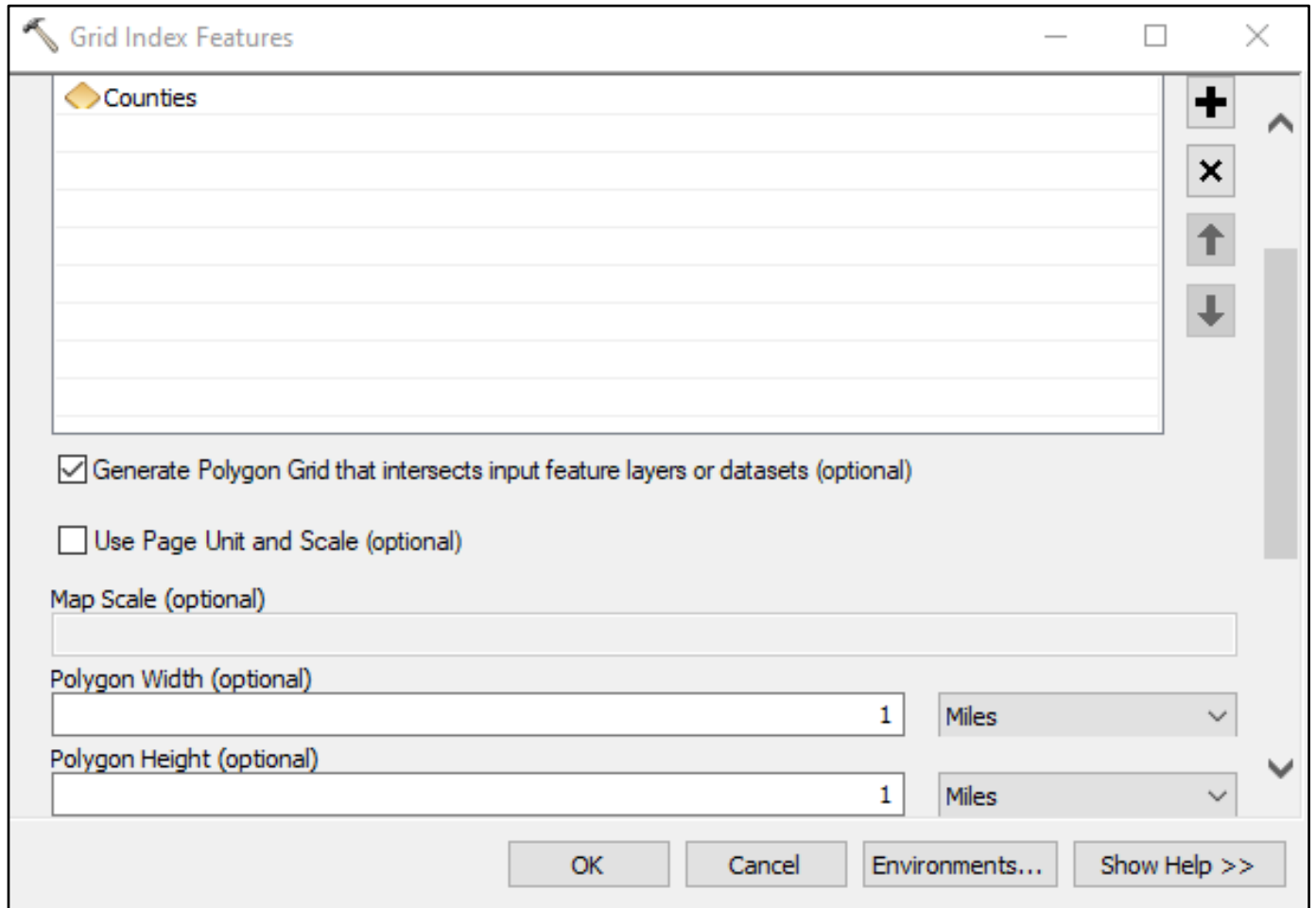


Figure 2 shows the selections that should be made using the Grid Index Features section.

Step 3: In this step a *Spatial Join* is applied with the *Grid Index Features* and *Pedestrian Crash Points* to aggregate the crash points contained within each square-mile cell. ESRI defines a *Spatial Join* as attributes from one feature to another based on the spatial relationship. The target features and the joined attributes from the join features are written to the output feature class. The grid cells and crash points share a spatial relationship and are symbolized based on the number of points within a cell.

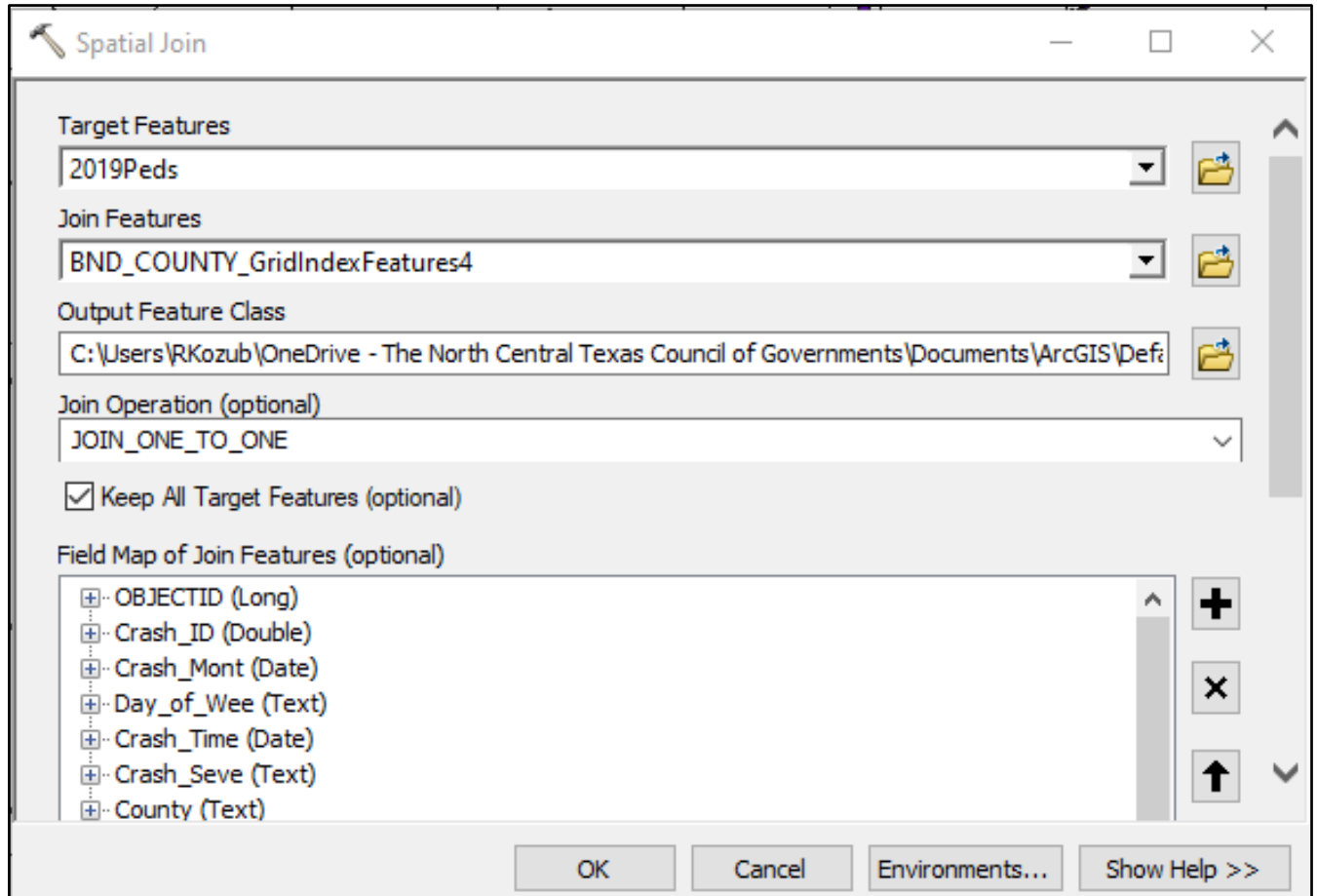


Figure 3 shows the Spatial Join.

Step 4: This step involves determining ranges for aggregated crash numbers. Selected ranges should be tailored to each map, depending upon crash density. Some counties have much lower counts, requiring less ranges to illustrate density. Ranges can be determined in a variety of ways: Equal Interval, Defined Interval, Quantile, Natural Breaks, Geometrical Interval, Standard Deviation, and Manual breaks.

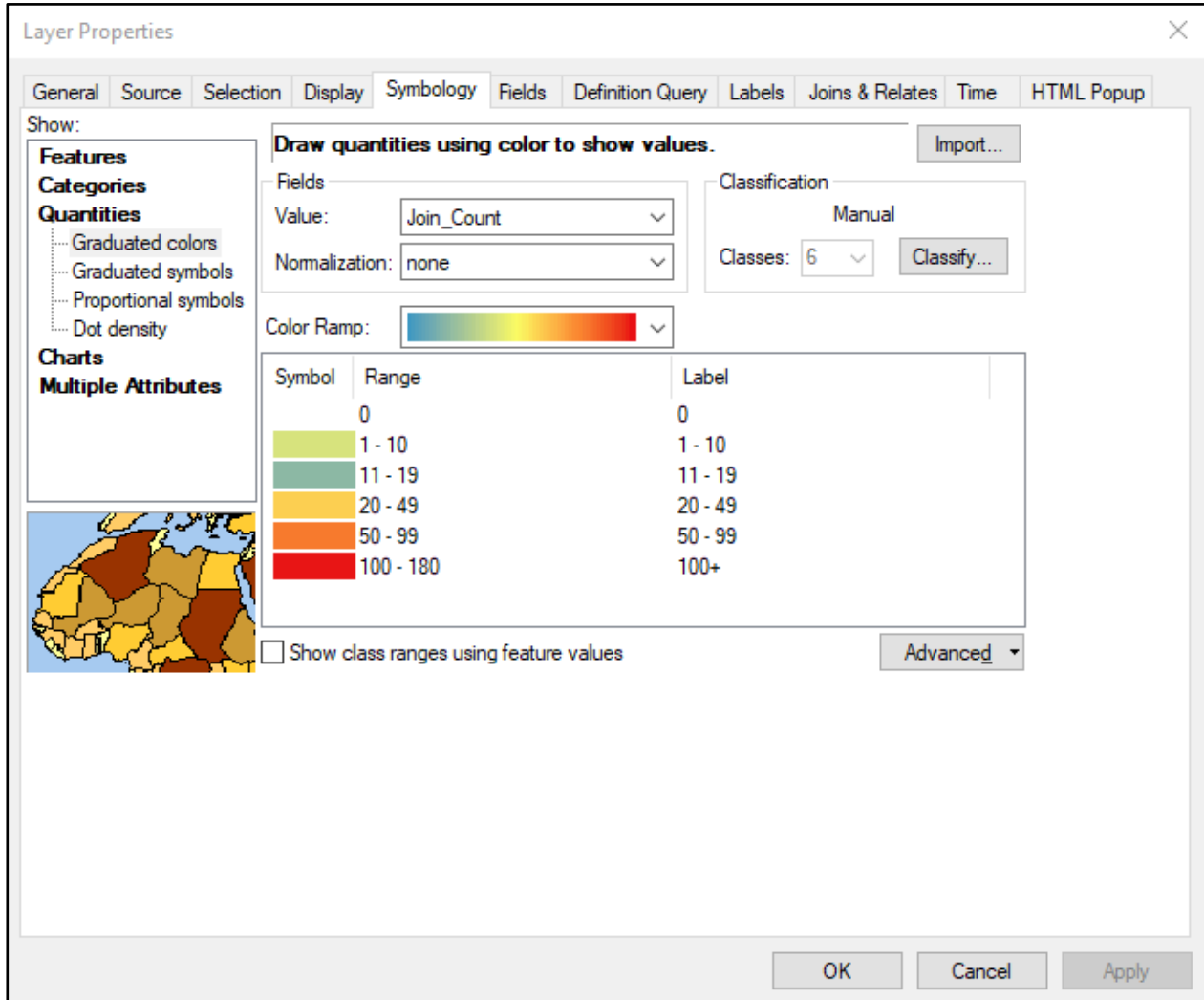


Figure 4 shows the ranges and color palettes.

15. Table of Square-Mile Cells Containing Ten-or-More Aggregated Pedestrian Crashes (2014-2018)

The following table represents the exported attribute table after spatially joining the crash data to the grid overlay. The square-mile cell identification number, the “Crash Count” (or, more precisely, the number of crashes within each cell), and the county and city are each listed.

Pedestrian Crashes Per Sq. Mi (2014-2018)			
ID	Crash Count	County	City
5731	180	Dallas	Dallas
5992	88	Tarrant	Fort Worth
5585	80	Dallas	Dallas
5586	63	Dallas	Dallas
5439	58	Dallas	Dallas
5438	54	Dallas	Dallas
5730	48	Dallas	Dallas
5732	47	Dallas	Dallas
4842	42	Dallas	Dallas
6284	41	Tarrant	Fort Worth
5879	39	Dallas	Dallas
5878	37	Dallas	Dallas
6022	33	Dallas	Dallas
4387	32	Dallas	Dallas
5880	31	Dallas	Dallas
6140	31	Tarrant	Fort Worth
6609	31	Dallas	Dallas
1637	29	Denton	Denton
6139	29	Tarrant	Fort Worth
5148	26	Dallas	Dallas
5440	26	Dallas	Dallas
6006	26	Tarrant	Arlington
5591	25	Dallas	Dallas
6025	25	Dallas	Dallas
6151	25	Tarrant	Arlington
6167	25	Dallas	Dallas
4234	24	Dallas	Dallas
5294	24	Dallas	Dallas
6138	24	Tarrant	Fort Worth

Pedestrian Crashes Per Sq. Mi (2014-2018)

ID	Crash Count	County	City
6168	24	Dallas	Dallas
4389	23	Dallas	Dallas
5437	23	Dallas	Dallas
6443	23	Tarrant	Arlington
6894	23	Dallas	Dallas
4082	22	Dallas	Dallas
4388	22	Dallas	Dallas
5446	22	Dallas	Dallas
6431	22	Tarrant	Fort Worth
4690	21	Dallas	Dallas
5291	21	Dallas	Dallas
5733	21	Dallas	Dallas
4836	20	Dallas	Dallas
5884	20	Dallas	Dallas
6322	20	Dallas	Dallas
4843	19	Dallas	Dallas
5289	19	Dallas	Dallas
5441	19	Dallas	Dallas
5698	19	Tarrant	Fort Worth
4848	18	Dallas	Garland
4989	18	Dallas	Dallas
4995	18	Dallas	Dallas
5699	18	Tarrant	Fort Worth
6276	18	Tarrant	Fort Worth
6297	18	Tarrant	Arlington
6608	18	Dallas	Dallas
1756	17	Denton	Denton
3921	17	Dallas	Carrollton
5587	17	Dallas	Dallas
6141	17	Tarrant	Fort Worth
6144	17	Tarrant	Fort Worth
6176	17	Dallas	Dallas
6278	17	Tarrant	Fort Worth
6285	17	Tarrant	Fort Worth

Pedestrian Crashes Per Sq. Mi (2014-2018)

ID	Crash Count	County	City
6310	17	Dallas	Dallas
6444	17	Tarrant	Arlington
6459	17	Dallas	Dallas
6898	17	Dallas	Dallas
3483	16	Denton	Dallas
3931	16	Dallas	Richardson
4064	16	Tarrant	Grapevine
5584	16	Dallas	Dallas
5885	16	Dallas	Dallas
5996	16	Tarrant	Fort Worth
6020	16	Dallas	Dallas
6142	16	Tarrant	Fort Worth
6299	16	Tarrant	Arlington
6895	16	Dallas	Dallas
3926	15	Dallas	Dallas
4079	15	Dallas	Dallas
4694	15	Dallas	Dallas
5293	15	Dallas	Dallas
5553	15	Tarrant	Fort Worth
5877	15	Dallas	Dallas
6019	15	Dallas	Dallas
6428	15	Tarrant	Fort Worth
6575	15	Tarrant	Fort Worth
6580	15	Tarrant	Fort Worth
6606	15	Dallas	Dallas
7040	15	Dallas	Dallas
3222	14	Collin	Plano
4074	14	Dallas	Farmers Branch
4083	14	Dallas	Richardson
4531	14	Dallas	Dallas
4541	14	Dallas	Dallas
6311	14	Dallas	Dallas
6432	14	Tarrant	Fort Worth
6445	14	Tarrant	Arlington

Pedestrian Crashes Per Sq. Mi (2014-2018)

ID	Crash Count	County	City
6461	14	Dallas	Dallas
6467	14	Dallas	Dallas
6722	14	Tarrant	Fort Worth
1757	13	Denton	Denton
2855	13	Collin	Plano
4390	13	Dallas	Garland
4847	13	Dallas	Garland
4982	13	Dallas	Irving
5290	13	Dallas	Dallas
5728	13	Dallas	Dallas
5860	13	Tarrant	Arlington
6007	13	Tarrant	Arlington
6021	13	Dallas	Dallas
6031	13	Dallas	Dallas
6152	13	Tarrant	Arlington
6277	13	Tarrant	Fort Worth
6288	13	Tarrant	Fort Worth
6312	13	Dallas	Dallas
6723	13	Tarrant	Fort Worth
6753	13	Dallas	Dallas
7041	13	Dallas	Dallas
1636	12	Denton	Denton
3924	12	Dallas	Addison
4394	12	Dallas	Garland
4988	12	Dallas	Dallas
5002	12	Dallas	Garland
5285	12	Dallas	Irving
5300	12	Dallas	Dallas
5430	12	Dallas	Irving
5588	12	Dallas	Dallas
5702	12	Tarrant	Haltom City
5874	12	Dallas	Dallas
6165	12	Dallas	Dallas
6166	12	Dallas	Dallas

Pedestrian Crashes Per Sq. Mi (2014-2018)

ID	Crash Count	County	City
6280	12	Tarrant	Fort Worth
6286	12	Tarrant	Fort Worth
6313	12	Dallas	Dallas
6317	12	Dallas	Dallas
6433	12	Tarrant	Fort Worth
6457	12	Dallas	Dallas
6460	12	Dallas	Dallas
6468	12	Dallas	Dallas
6577	12	Tarrant	Fort Worth
6588	12	Tarrant	Arlington
6605	12	Dallas	Dallas
6738	12	Tarrant	Arlington
3084	11	Denton	Lewisville
3492	11	Collin	Richardson
4391	11	Dallas	Garland
5005	11	Dallas	Garland
5154	11	Dallas	Dallas
5292	11	Dallas	Dallas
5417	11	Tarrant	Hurst
5444	11	Dallas	Dallas
5592	11	Dallas	Dallas
5734	11	Dallas	Dallas
5889	11	Dallas	Mesquite
6026	11	Dallas	Dallas
6032	11	Dallas	Mesquite
6178	11	Dallas	Dallas
6321	11	Dallas	Dallas
1787	10	Collin	McKinney
3102	10	Collin	Plano
3204	10	Denton	Lewisville
3325	10	Denton	Lewisville
4226	10	Dallas	Farmers Branch
4231	10	Dallas	Dallas
4236	10	Dallas	Richardson

Pedestrian Crashes Per Sq. Mi (2014-2018)			
ID	Crash Count	County	City
4540	10	Dallas	Dallas
5136	10	Dallas	Irving
5450	10	Dallas	Sunnyvale
5589	10	Dallas	Dallas
5593	10	Dallas	Mesquite
5737	10	Dallas	Dallas
5990	10	Tarrant	Fort Worth
6004	10	Tarrant	Arlington
6015	10	Dallas	Grand Prairie
6030	10	Dallas	Dallas
6137	10	Tarrant	Fort Worth
6143	10	Tarrant	Fort Worth
6150	10	Tarrant	Arlington
6158	10	Dallas	Grand Prairie
6162	10	Dallas	Dallas
6169	10	Dallas	Dallas
6290	10	Tarrant	Fort Worth
6434	10	Tarrant	Fort Worth
6462	10	Dallas	Dallas
6589	10	Tarrant	Arlington
6604	10	Dallas	Dallas
6755	10	Dallas	Dallas
7042	10	Dallas	Dallas
9639	10	Ellis	Waxahachie

16. Overview of Crashes Within Square Mile Cells

The total number of reported pedestrian crashes in the region between 2014-2018 was 7,388. The total number of square-mile cells with at least one reported crash was 1,634. Of these 1,634 cells, those cells containing 20+ reported crashes totalled 44 cells, capturing 21 percent of the total reported crashes. Similarly, those cells containing 10-19 reported crashes totalled 145 cells and captured 26 percent of the total reported crashes. Together, the total number of cells within this range was 189 (44+145), only ~12 percent of the total cells having

at least one reported crash; however, within this ~one percent of cells, 47 percent of the total reported crashes were captured.

Total Crashes	Total Sq. Mi. Cells with x>0 Crashes	Total Sq. Mi. cells with 20+ Crashes	% of Crashes within 20+ Sq. Mi. Cells	Total Cells with 10-19 Sq. Mi. Crashes	% of Crashes within 20+ Sq. Mi. Cells	Total Percentage of Crashes with 10+ Sq. Mi. Cells
7388	1634	44	21%	145	26%	47%