STRATEGIC TRANSPORTATION SAFETY PLAN UPDATE

Osage Nation

Vision Statement

The purpose of the Strategic Transportation Safety Plan is to ensure the safety and improve the quality of life for the members of the Osage Nation, for those who live within its tribal jurisdictional area, and for those who travel within its boundaries.

August 2019

Contents

ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
BIA	Bureau of Indian Affairs
CDC	Center for Disease Control
CHR	Community Health Representative
DOT	Department of Transportation
EMS	Emergency Medical Services
F-O	Fixed-Object
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
Four (4) Es	Engineering, Enforcement, Education, Emergency Services
HSIP	Highway Safety Improvement Plan
INCOG	Indian Nations Council of Governments
LRSP	Local Road Safety Plan
LTAP	Local Technical Assistance Program
MUTCD	Manual on Uniform Traffic Control Devices
NBI	National Bridge Inventory
NCHRP	National Cooperative Highway Research Program
NHI	National Highway Institute
NHTSA	National Highway Traffic Safety Administration
NTTFI	National Tribal Transportation Facility Inventory
ODOT	Oklahoma Department of Transportation
OHP	Oklahoma Highway Patrol
OHSO	Oklahoma Highway Safety Office
R/O	Rollover
RwD	Roadway Departure
SAFE-T	Statewide Analysis for Engineering & Technology
SAFETEA-LU	Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users
SHSP	Strategic Highway Safety Plan
STIP	State Transportation Improvement Plan
STSP	Strategic Transportation Safety Plan
TIP	Transportation Improvement Program
TTAM	Tribal Transportation Allocation Methodology
TTAP	Tribal Technical Assistance Program
TTP	Tribal Transportation Program
TTPSF	Tribal Transportation Program Safety Funds

Introduction

Tribal Transportation Program Safety Funds

The Tribal Transportation Program (TTP) is the largest program in the Office of Federal Lands Highway. The purpose of the TTP is to address the transportation needs of Tribal governments throughout the United States. The program received $465 million in fiscal year 2016 with increases of $10 million per year to $505 million in fiscal year 2020, as established in Public Law 114-94, Fixing America's Surface Transportation Act (FAST Act). Funds are allocated among Tribes using a statutory formula based on tribal population, road mileage, and average tribal shares of the former Tribal Transportation Allocation Methodology (TTAM) formula.

Native American and Alaska Native populations experience higher rates of transportation related fatal injuries. To identify causes and develop countermeasures, Tribal Transportation Program Safety Funds (TTPSF) have been made available to federally recognized Indian Tribes through a competitive, discretionary program. Each year under the FAST Act, 2% of the available TTP funds are set aside for Tribal transportation safety. Eligible projects for the TTPSF under the FAST Act include 1) the development and update of transportation safety plans; 2) crash data assessment, improvement, and analysis; and, 3) infrastructure improvements and other eligible activities listed in 23 U.S.C. 148(a)(4).

The development of a Strategic Transportation Safety Plan (STSP) has been encouraged as a means to address transportation safety issues in tribal communities through the four Es: Engineering, Enforcement, Education, and Emergency Medical Services. Using TTP safety funds, the Osage Nation STSP was developed in June 2014 to serve as a foundation and justification for safety improvement projects. While TTPSF funded the transportation safety plan, the goal of the safety plan is to identify data-driven needs regardless of resources or specific funding. After three years, a Tribe may apply for funding to update the transportation safety plan. Updates may assess safety data improvement opportunities, consider priority areas from the STSP, and reevaluate available safety data and priorities. This document is the five-year evaluation and update of the Osage Nation's STSP (2014).

The Osage Nation

The Osage Nation is conterminous with Osage County in northern Oklahoma and is mostly rural. Osage Nation has a 5-year transportation improvement plan already in place, and the Osage Nation hopes to incorporate safety measures to assist with these planned projects. In addition, the Osage Nation has an updated Long Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP) to set priorities and estimate funding for proposed road improvement projects. Roads available for funding must be listed in the National Tribal Transportation Facility Inventory (NTTFI). Several projects for Osage County are listed on the Statewide Transportation Improvement Plan (STIP). The STIP (FFY 2018-2021) can be accessed online: http://www.okladot.state.ok.us/p-r-div/stip/STIP_2018-21/2018STIPPRO_SEP2618.pdf.

Osage County is home to the Tallgrass Prairie Preserve, north of the town of Pawhuska. Pawhuska is the county seat the where the Osage Nation is headquartered. In the state of Oklahoma, tribes have designated jurisdictional areas. The Osage Nation is unique in that it is the only federally recognized reservation in Oklahoma due to its hold on sub-surface land rights. The jurisdictional area is approximately 1.47 million acres. The majority of roads within the jurisdictional area are state or county owned but the Osage Nation has some tribally owned roads located on trust lands.

Osage Nation Transportation Safety Plan Update

The Osage Nation is one of the first Tribes that has applied for and received TTP safety funds for an STSP Update. The original Osage Nation Strategic Transportation Safety Plan was initiated in June 2014 and completed in August of that same year. The geographic region studied was the tribal jurisdictional boundary of the Osage Nation. Emphasis areas and critical locations were identified through a stake-holder's safety planning meeting and crash data for Osage County.

The purpose of this document is to provide an update of the transportation safety plan that was developed in 2014 for the Osage Nation. The original document was developed with a focus on the 4Es: Engineering, Enforcement, Education, and Emergency Medical Services. The original STSP (Strategic Transportation Safety Plan) was intended to be a dynamic document that could be updated and adapted as roadways were improved, legislation changed, and technology advanced.

A public meeting was held on July 10, 2019, to review the 2014 emphasis areas, to present findings of improvements and crash data comparisons, and discuss new safety concerns for the emphasis areas. Notes from the safety planning meeting are included within Appendix A. To properly update this plan, a complete review of the 2014 emphasis areas was required to determine and justify the removal of an emphasis area and to consider which emphasis area to carry over to 2019 and what strategies should be considered. The 2014 Emphasis Area Review is included as Appendix B.

At the meeting, concerns were expressed for the increased recreation and tourism traffic that are a result of the "Pioneer Woman" Ree Drummond, a native of Pawhuska, who has built a business enterprise through her online presence, television personality, numerous cookbooks, children's books, and merchandise. The Mercantile opened on October 31, 2016, after three years of renovations. Pawhuska has now become somewhat of a pilgrimage site for tourists from around the country and world. The Pioneer Woman Mercantile is located along US 60/SH 11, at the corner of Kihekah Ave. The influx of visitors caused the vision statement of this safety plan update to change and created new transportation safety concerns especially for pedestrians who are now crossing the highway through town and walking the streets of Pawhuska. Concerns also expressed were for visitors who are unfamiliar with the roadways, the passage through Pawhuska, the topography of the area, and the gravel roads leading to the Tallgrass Prairie.

Within this document, national emphasis areas will be reviewed, Osage Nation collisions will be analyzed, and new emphasis areas will be identified.

Tribal Strategic Transportation Safety Plan

Tribal Transportation Safety Plans are a tool to identify transportation risk factors and explore countermeasures. In August 2017, the Tribal Transportation Strategic Safety Plan for the country was presented to the U.S. Congress. The national plan was intended to identify and discuss common transportation safety issues for Tribes across the country. The plan justifies the need and funding for Tribal areas by recognizing that solid data collection methods are lacking that would allow Tribes to better understand, identify, and share tribal transportation safety issues.

Five emphasis topics were identified at the national level to improve safety on Tribal lands:

- Occupant Protection Devices
- Roadway Departure
- Impaired Driving
- Pedestrians
- Availability of Public Safety Services.

Topics identified as emerging or of interest to many Tribes but not as prominent at the national level were speed, driver distraction, intersections, young drivers, older drivers, off-road transportation, and animal-vehicle crashes. The complete report can be found at

https://flh.fhwa.dot.gov/programs/ttp/safety/documents/tribal-transportation-safety-plan.pdf

National Emphasis Areas

Occupant Protection Devices

According to the Center for Disease Control (CDC), motor vehicle crashes are a leading cause of unintentional injury death for Native American adults and children. The death rate for Native Americans is more than twice of non-Hispanic whites or blacks; among all racial/ethnic groups, Native American children experience the highest fatal and nonfatal injury rates. The major risk factors are low seat belt use and child safety restraint use in Indian Country.

Occupant protection was not discussed in the original STSP for a couple of reasons. First, the State of Oklahoma has a primary seatbelt law which means that a driver can be pulled over for not being buckled. Children under 2 years must be in a rear-facing car seat and car seats are required until 4 years of age. Booster seats are required until 8 years of age and children riding in the backseat must be buckled up until 13 years of age. Secondly, the Osage Nation Community Health Representative (CHR) program has provided car/booster seats for a minimal price and installation assistance since 2005. In addition, the crash data does not support a need to focus on this topic.

Roadway Departure (RwD)

Roadway departure (RwD) crashes are defined as when a vehicle leaves the traveled way and results in a crash. These crashes represented 63% of all reported motor vehicle fatalities in Tribal areas (2010-2014). Roadway alignment is considered an important contributing factor. The National STSP states that 35% of roadway departure fatalities in Tribal areas occurred in a horizontal curve, in keeping with crash statistics across the county.

Roadway geometry deficiencies were discussed within the original STSP. The contributing factors were identified as topography, shoulder widths, and typical rural highway crashes. These items will be explored further in the following section where the Osage Nation's new emphasis areas are identified.

Impaired Driving

Native Americans experience a disproportionately high percentage of alcohol-involved crashes and have the highest alcohol-related motor vehicle death rate of all racial groups. Drugs and alcohol often go hand-in-hand, and typically drugs will not be tested if alcohol is involved (drugs are metabolized differently and require their own special tests). Most fatalities in Tribal areas involve alcohol as a contributing factor.

The State of Oklahoma is home to thirty-eight federally recognized Tribes with trust lands parceled out within the Tribal Jurisdictional Areas. Impaired driving among Native Americans is not a measurable statistic due to the lack of formal reservations in Oklahoma. Alcohol-related crash data for Native Americans is only available in the event of a fatality. Therefore, impaired driving was not included within the original STSP because the concerns are shared by Osage County and the State and not unique to the Osage Nation.

The Osage Nation endorses the statewide ENDUI Oklahoma initiative that focuses on prevention, enforcement, adjudication, and media efforts to reduce impaired driving-related crashes. Traffic fatalities have been declining over the last five years in the state of Oklahoma. https://enduiok.com/

Pedestrians

Across the country, pedestrian safety is common to all Tribes, regardless of population or land holdings. Native Americans have the highest pedestrian fatality risk of any racial group. As expected, most Tribal pedestrian fatalities occur in rural areas and after dark. The lack of pedestrian infrastructure contributes to the risk: a large portion of tribal transportation safety funds applications request improvements. Pedestrian safety is a growing priority for the Osage Nation as pedestrian traffic increases within the tribal boundaries.

Availability of Public Safety Services

Emergency response times are a major concern for most Tribes given the rurality of Reservation lands and the location of tribal complexes. To improve response times, Tribes are seeking to update 911 systems, improve street and address signage, build helipads, and expand communication capabilities. Emergency preparedness to mitigate response times during emergencies and natural disasters is discussed in the Osage Nation's STSP.

Collision Analysis

This update will analyze the collision data of the last five years (2014-2018) and compare to the collision data as presented in the original STSP (2009-2013). Figure 1 shows the collisions that occurred during the 2014-2018 time span. The complete crash data report is included within Appendix C.

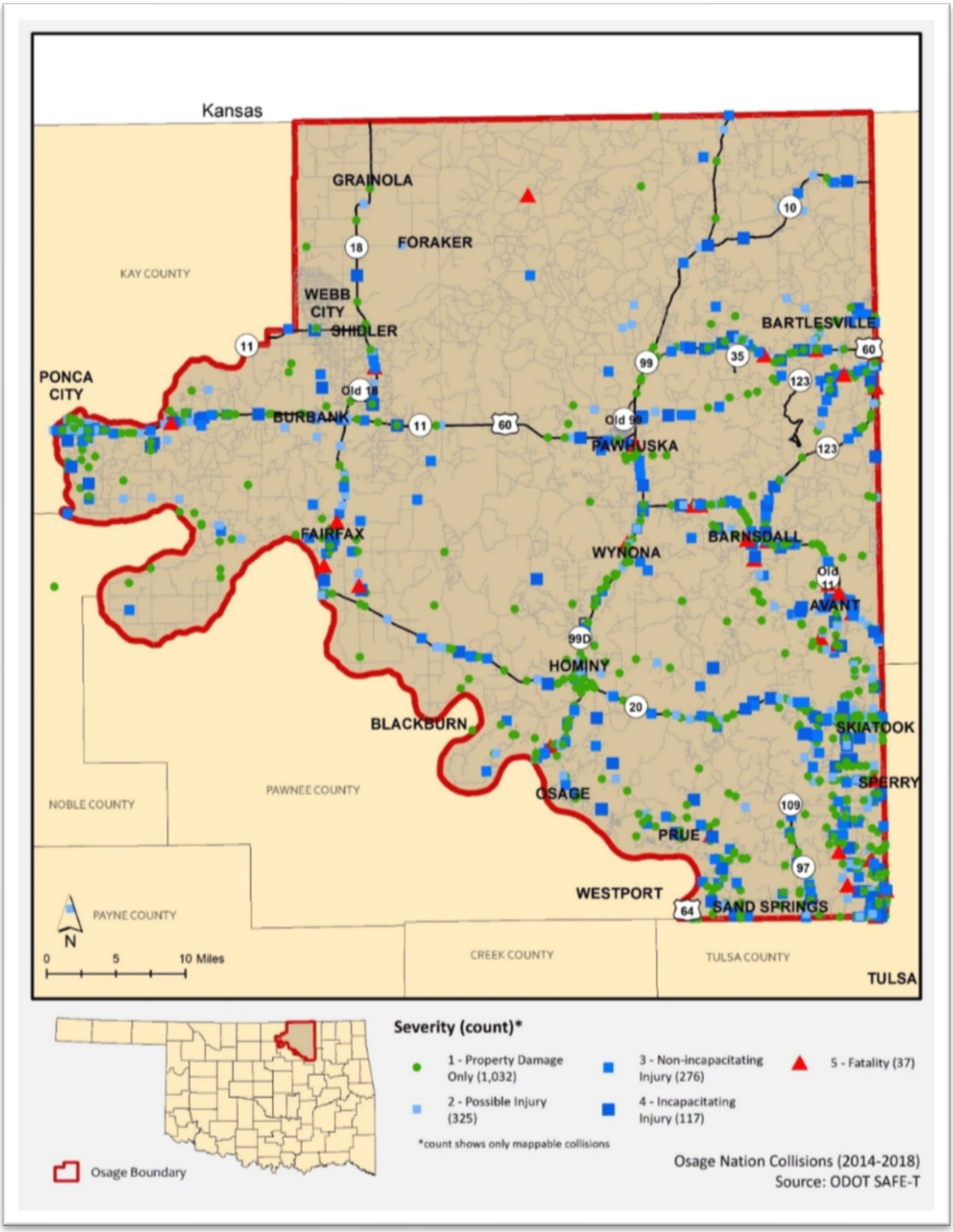


Figure 1.Osage Nation Collisions (2014-2018)

Slight decreases in the number of severe collisions occurred within the Osage Nation over the last five years. The table below shows the comparison of the 2009 – 2013 dataset to the 2014 – 2018 dataset. The crashes are counted by the number of collisions according to severity and by the total number of persons affected.

Table 1. Osage Nation Crash Data Severity Comparison

	2009 to 2013					
	Fatality	Incapacitating Injury	Non-incapacitating Injury	Possible Injury	PDO	Total
Collisions	50	150	361	338	1119	2018
Persons	58	190	501	562		1311
	2014 to 2018					
	Fatality	Incapacitating Injury	Non-incapacitating Injury	Possible Injury	PDO	Total
Collisions	38	121	285	355	1120	1919
Persons	42	145	394	517		1098

Severity is classified by Fatality (5), Incapacitating Injury (4), Non-incapacitating Injury (3), Possible Injury (3), and Property Damage Only (PDO).

These numbers are in line with the overall trends of decreasing fatalities and serious injury crashes over the last several years as reported by the Oklahoma Highway Safety Office (OHSO).

http://ohso.ok.gov/Websites/ohso/images/CrashBooks/2018/2018_S0_QuickFacts.pdf

The top five types of collisions are the same for both datasets: Angle-Turning, Rear-End, Rollover, Right-Angle, and F-O (fixed-object) Tree. In all but angle-turning, the most recent data reveals an increase despite a decrease in all collisions. However, the severe crashes for these collision types have decreased. Severe crashes are those the resulted in an injury or fatality (severity 3, 4, or 5). The chart below shows the comparison of the two timeframe datasets.

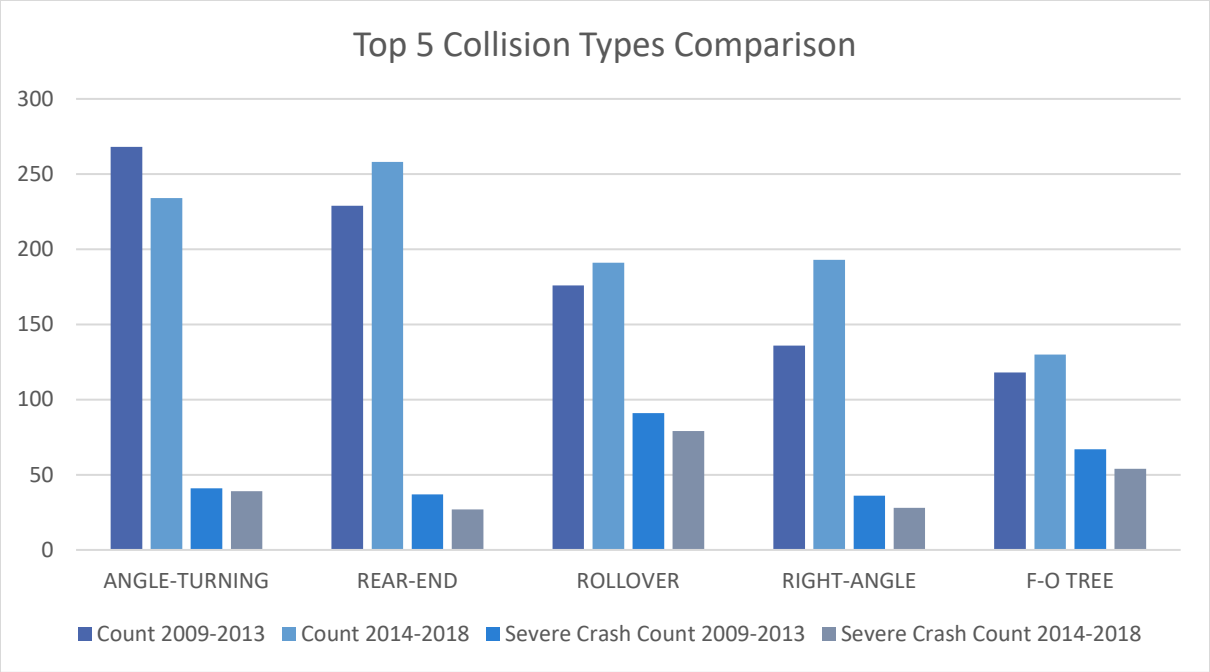


Figure 2. Osage Nation Top 5 Collisions Comparison

The maps showing the locations of the top five collision types are included within Appendix D. These collisions will be examined more closely to discover common contributing factors, identify locations of concern, and explore the most appropriate safety countermeasures. Rollover and Fixed-Object crashes are classified as Roadway Departure (RwD) crashes and will be discussed in the New Emphasis Area (2019) section of this document.

Emphasis Areas (2019)

Emphasis Area 1: Roadway Departure (RwD) Crash Reductions

Roadway Departure Safety is such a priority that the FHWA's efforts to reduce RwDs are guided by the Strategic Approach and Plan that target keeping vehicles on the roadway, provide for safe recovery, and reduce crash severity. Based on the Osage Nation's crash data, Rollover and Fixed-Object (F-O) Tree types are RwD crashes that need to addressed.

Rollover Crash Types

Rollover crashes, also referred to as Overturn crashes, account for the majority of highway fatalities across the nation. According to the FHWA, Rollover/Overturn (R/O) crashes account for 30% of all fatal RwD crashes. The risk factors for these crashes are rural areas, speed limits greater than 30 mph, and curves. Strategies for treating R/O crashes include curve delineation, friction treatments in curves, edge lines and shourlder rumble strips, safety edges, clear zones, traversable roadside slopes, and barriers to shield fixed objects and slopes.

http://safety.fhwa.dot.gov/roadway_dept/
http://safety.fhwa.dot.gov/roadway_dept/strat_approach/

Within the Osage Nation study area, 176 of total collisions were Rollovers (9.2%). Over half (54.0%) of these occurred on county roads (non-highways). Drugs and/or alcohol were cited in 25.0% of these crashes. The collisions were scattered throughout the study area.

Fixed-Object (F-O) Collisions

Nationally, around 20% of motor vehicle crash deaths result from a vehicle leaving the roadway and hitting a fixed-object (F-O). Nearly half of these deaths occur at night and nearly half are F-O Tree. Most fixed-object collisions are the result of driver error or behavior (source: Insurance Institute for Highway Safety).

Fixed-object collisions, as an overall group, were scattered throughout the Osage Nation. However, the F-O Tree was pronounced in the Osage Nation 2014-2018 dataset and several clusters appeared. Over 6% of the collisions were designated as F-O Tree: six of these were fatalities, fourteen were incapacitating injuries, and thirty-four were non-incapacitating injuries. Drugs and/or alcohol were involved in 29.7% of the F-O Tree crashes. Looking at the crash data locations, several clusters of F-O Tree appeared (Appendix D). The most notable location was southeast of Avant along SH 11 where the roadway is curved and lined with trees on either side, limiting the sight view (Figures 3 and 4).

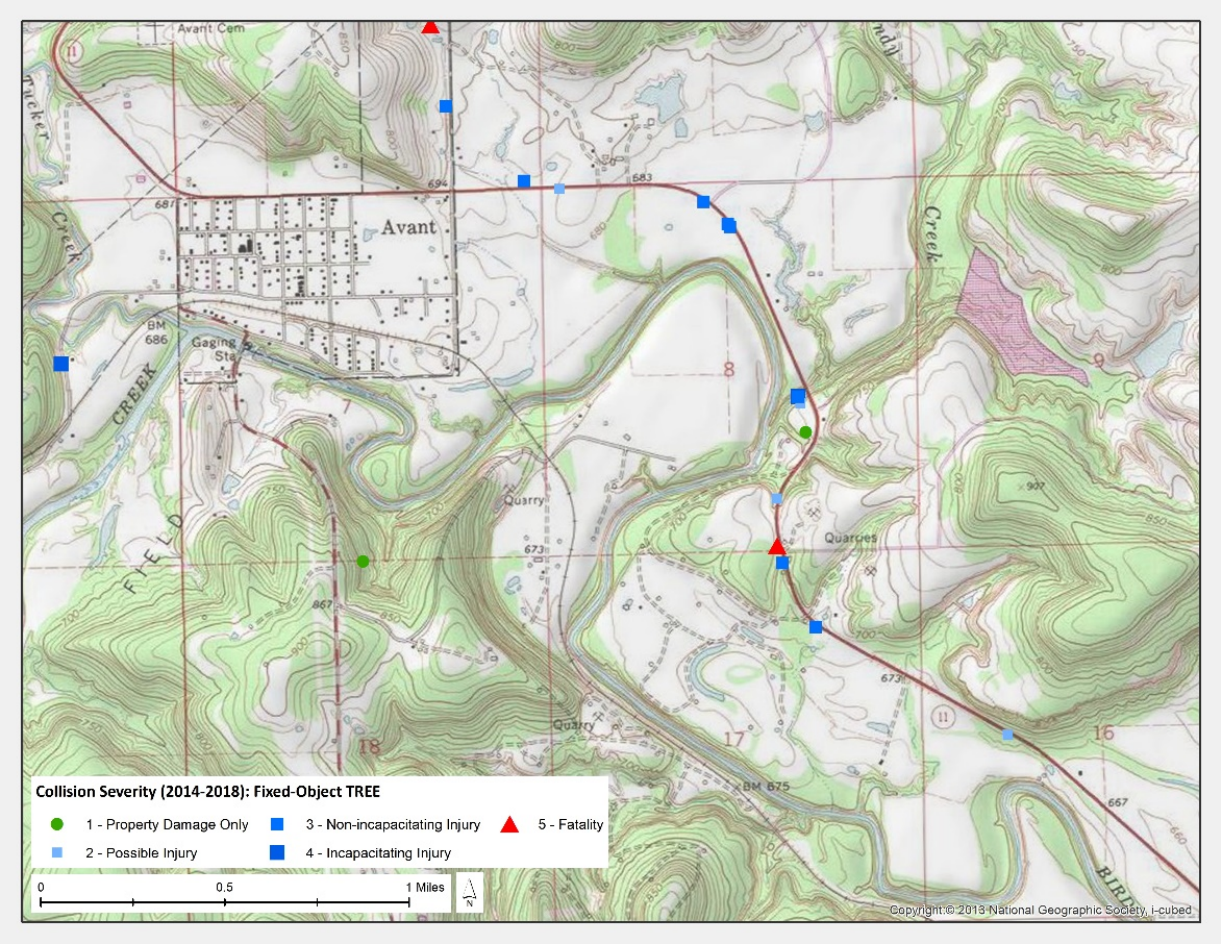


Figure 3. Avant F-O Tree Crashes

Figure 4. Photograph of SH 11 in Avant (near fatality collision)

Goal

The goal for this emphasis area is to identify and reduce roadway departure crashes by correcting roadway geometries where known deficiencies exist and applying the appropriate safety countermeasures.

Strategies

Engineering:

- Identify locations where greater numbers of Rollover and F-O collisions occur.
- Perform a safety review and/or road safety audit of roadways with high numbers of collisions to evaluate limited sight distance areas, where additional signs and markings are needed, and where other deficiencies exist so that the proper safety countermeasures can be applied.
- Conduct a study of driver conditions to determine the influence of driver behavior in RwD collisions.
- Develop a Roadway Departure Strategic Plan
    - http://safety.fhwa.dot.gov/roadway_dept/docs/rwd_strategic_plan_version2013.pdf
- Correct any roadway deficiencies that show to be linked to the collisions, improve signage at critical locations, and apply high-friction surface treatments (HFST) at priority locations.
- Further studies of crashes would be required to identify causation and appropriate countermeasures. A systemic approach could be taken to apply the same safety countermeasure(s). A systemic approach is an innovation found in the FHWA Every Day County-3 Initiative that involves applying widespread safety countermeasures, often low cost, a locations with similar crash types.
- Speed deterrents

Education:

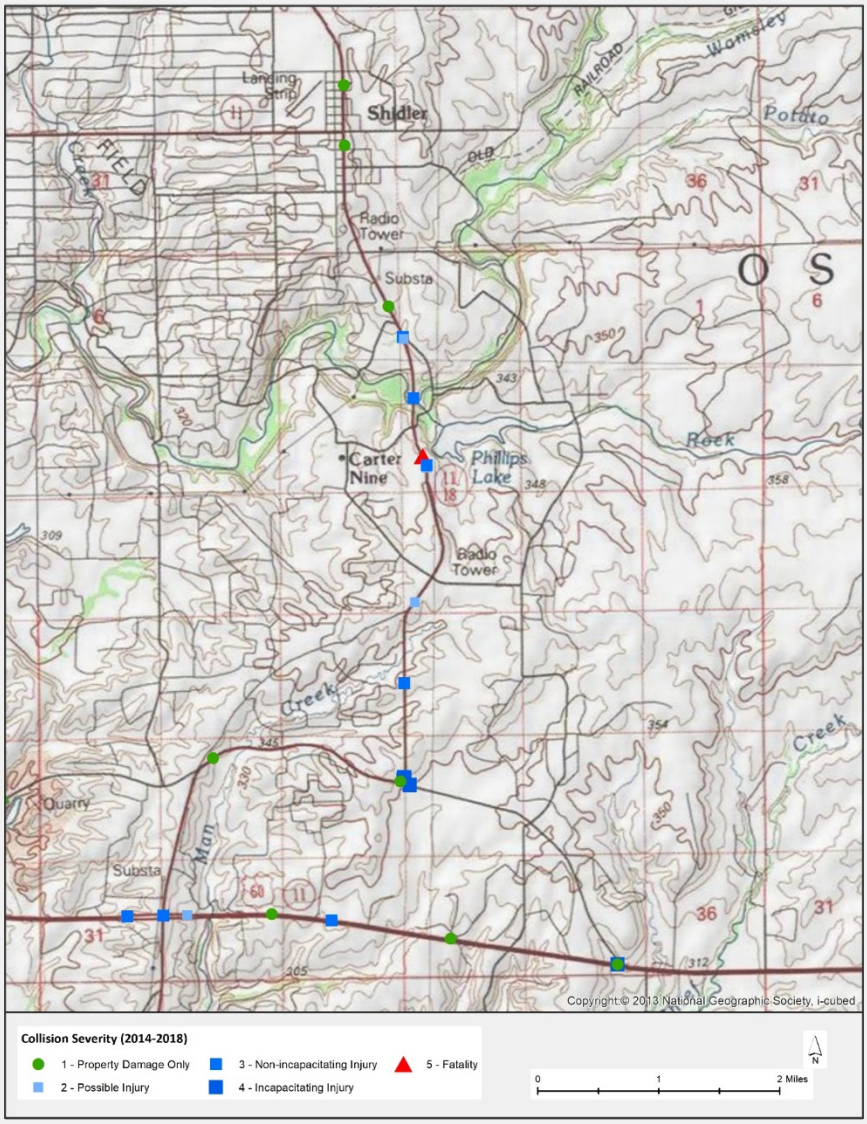
- Develop education programs to address behavioral contributing factors to RwD crashes
  - http://tribalsafety.org/Resources/Run-Off-the-Road
- Improve signage at critical locations

Enforcement:

- Identify high risk area to target
- Placement of speed deterrents

Emphasis Area 2: Critical Crash Locations

The critical crash locations discussed were identified in the original transportation safety plan and the recent crash data supports their inclusion within this transportation safety plan update.



SH 18 – South of Shidler

This 9-mile stretch of roadway is still a cause for concern, and the intersection of SH 18 and Old Hwy 60 is of special concern. South of Shidler, the topography drastically changes, and the road becomes winding with many vertical curves. Figure 5 shows the crash data for this roadway. Nineteen collisions occurred along the roadway, ten of which occurred at the intersection.

Figure 5. SH 18 south of Shidler

52nd W Ave & 133rd St. N (Skiatook)

This location in southwest Skiatook is still a major concern. Sixteen collisions are recorded on the north and east of the curve with seven collisions occurring along the curve. This location remains an area of roadway safety concern for the Osage Nation.

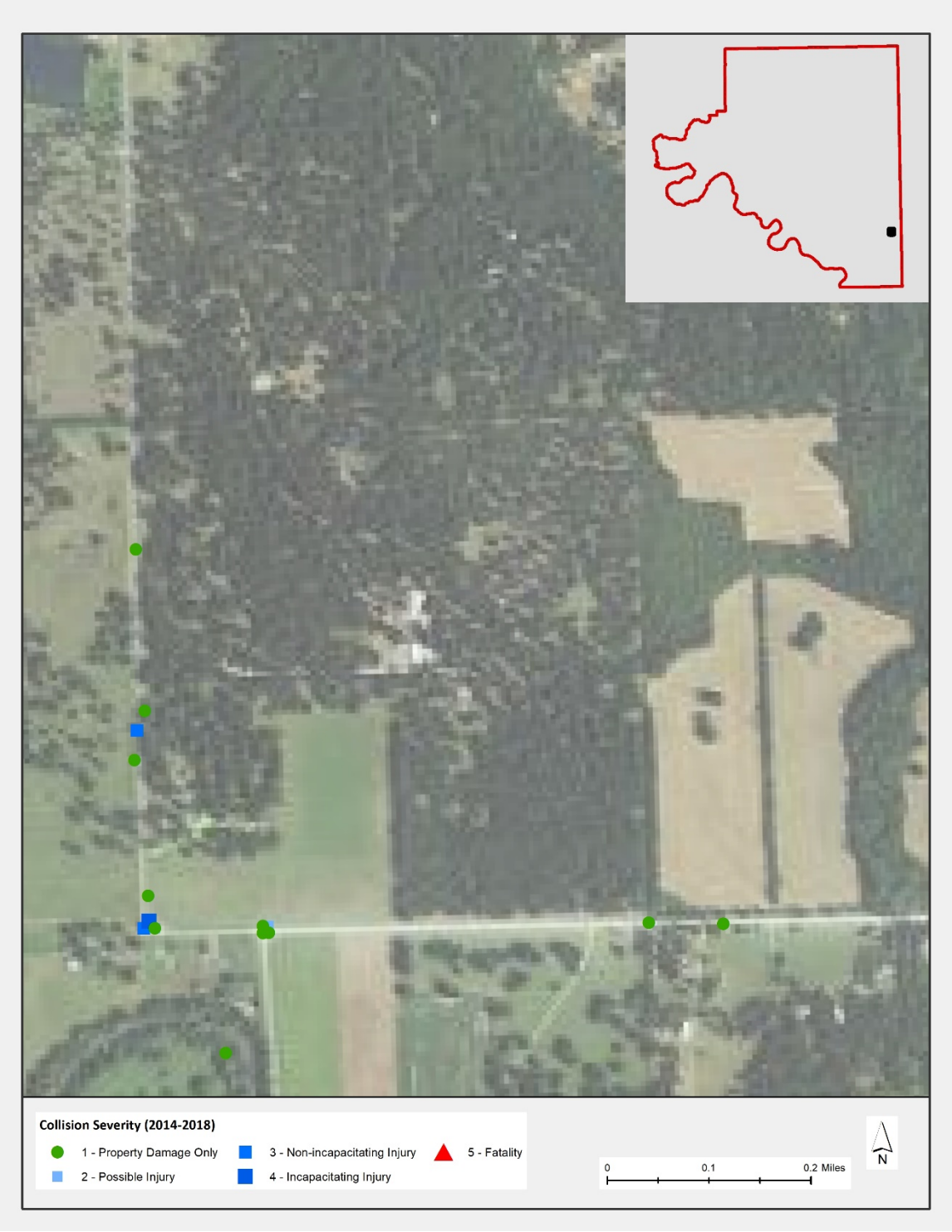


Figure 6. 52nd W Ave at 133rd St. N (Skiatook) Crash Map

Figure 7. Curve at 52nd W Ave and 133rd St. N

Goal

The goal for this emphasis area is to improve reduce severe crashes by correcting roadway geometries where known deficiencies exist and by applying the appropriate safety countermeasures.

Strategies

Engineering:

- Perform a safety review and/or road safety audit of identified roadways to evaluate limited sight distance areas, where additional signs and markings are needed, and where other deficiencies exist so that the proper safety countermeasures can be applied.
- Correct any roadway deficiencies that show to be linked to the collisions, improve signage at critical locations, and apply high-friction surface treatments (HFST) at priority locations.
- Further studies of crashes would be required to identify causation and appropriate countermeasures. A systemic approach could be taken to apply the same safety countermeasure(s). A systemic approach is an innovation found in the FHWA Every Day County-3 Initiative that involves applying widespread safety countermeasures, often low cost, a locations with similar crash types.
- Speed deterrents

Education:

- Improve signage at critical locations

Enforcement:

- Target high risk locations
- Placement of speed deterrents

Emphasis Area 3: Heavy Truck Traffic

Osage Nation is home to several oil field operations and oil refineries, wind farms in various stages of development, and rock quarries. As a result, the county is plagued by heavy trucks carrying hazardous loads. The county has designated truck routes, but these are not always followed. Heavy trucks often pass through the small towns. The infrastructure of these towns cannot support the excessive weight and suffer the burden of a collapsing road system. The Oklahoma Highway Patrol has a Commercial Vehicle Enforcement Division (https://www.dps.state.ok.us/ohp/troops.htm).

> The following is taken from the Oklahoma Department of Public Safety, Oklahoma Highway Patrol website:
>
> *The Commercial Vehicle Enforcement Unit of the Oklahoma Highway Patrol pursues public safety through the reduction of commercial vehicle collisions and criminal activity:*
>
> • *By employing innovative and effective enforcement strategies based upon statistical data*
> • *By focusing on problem-specific activities in the commercial vehicle industry*
> • *By utilizing all available resources, including not only enforcement but also education*

The tribal police and local law enforcement would be expected to work with the OHP and ODOT to deter heavy truck traffic from deviating from designated routes.

Goal

The goal for this emphasis area is to better regulate heavy truck traffic for the safety of motorists within the Osage Nation.

Strategies

Engineering:

- Identify and evaluate designated truck routes
- Identify where heavy trucks are known to travel through the communities, especially non-designated truck route areas

Education:

- Increase awareness of size and weight regulations as determined by the Oklahoma Department of Public Safety and FHWA
- Outreach to the companies hauling freight through the Osage Nation
- The Peer-to-Peer Program (P2P) organized by the FHWA
    - http://ops.fhwa.dot.gov/freight/fpd/p2p/index.htm

Enforcement:

- Coordination with Oklahoma Department of Public of Safety and ODOT's permitting system
- Compliance with the federal standards as certified by the FHWA
    - http://ops.fhwa.dot.gov/freight/index.cfm
- Conduct periodic checkpoints for heavy trucks

Emphasis Area 4: Bridges Evaluation

Flooding is not so much a concern as is the deteriorating conditions of the bridges and heavy truck traffic experienced by them. The county commissioners and Osage Nation roads department expressed concern for the deleterious effects of heavy truck traffic on the bridges throughout the county. Therefore, it was deemed worthwhile to see which bridges are designated within the ODOT workplan and to explore TTP bridge funding for those insufficient bridges along major truck routes. Fourteen bridges are currently on the ODOT workplan. The following map shows the roadways and bridges scheduled for improvements within Osage County (Figure 9).

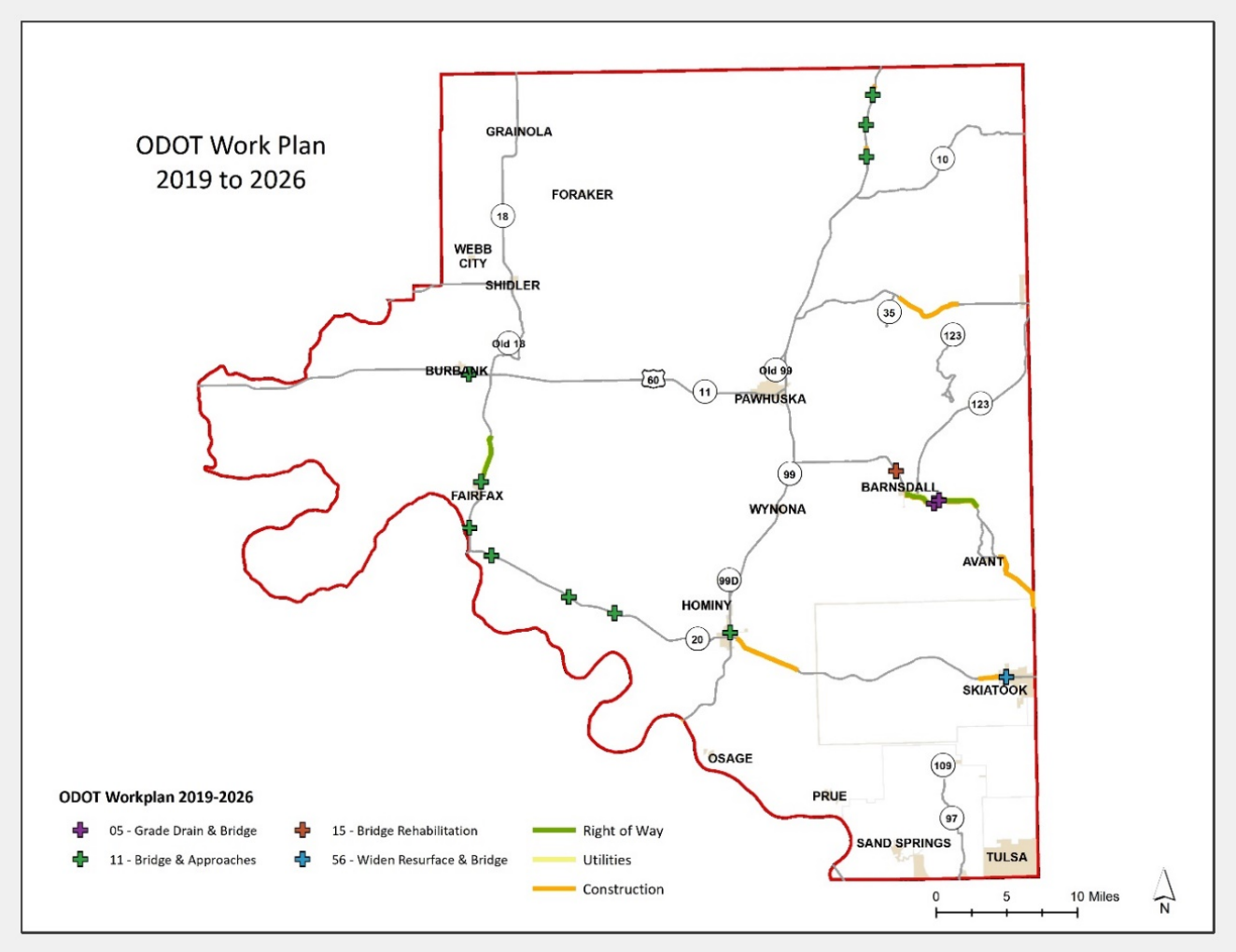


Figure 8. ODOT Workplan 2019-2026

In Osage County, ODOT records show 274 off-system bridges. Sufficiency ratings are used by the FHWA to measure the ability of a bridge to remain in service, of a bridge's candidacy for the Highway Bridge Program (a sufficiency rating of less than 80). A bridge of a sufficiency rating below 50 would be in serious need of repairs. Of these, 154 have a sufficiency rating of less than 80; and, 90 have a sufficiency rating

of less than 50. The map below shows the location and sufficiency ratings of the off-system bridges in Osage County (Figure 10).

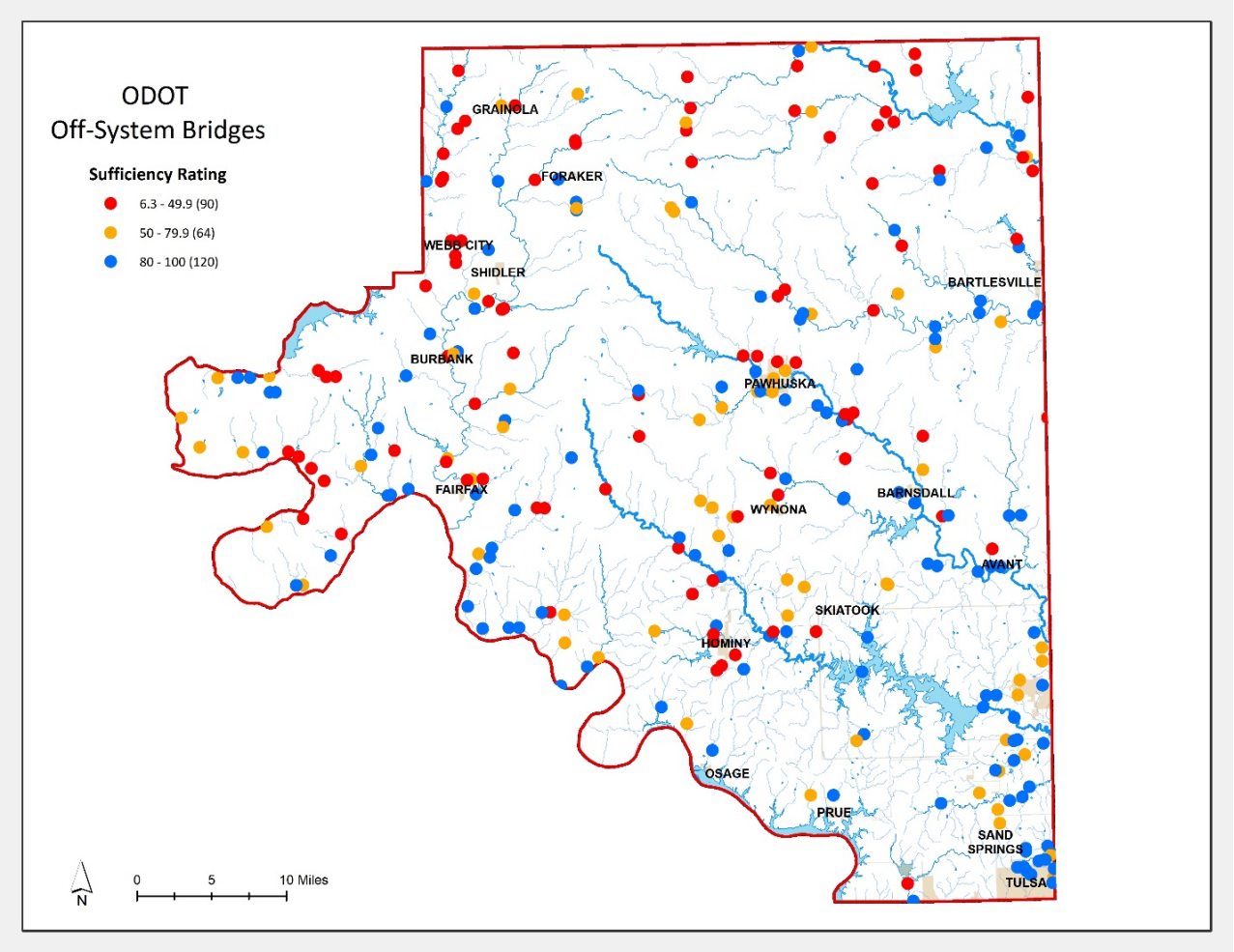


Figure 9. ODOT Off-System bridge, sufficiency ratings

Goal

The goal of this this emphasis area is to monitor, manage, and improve bridge conditions within the Osage Nation.

Strategies

Engineering:

- Develop a bridge asset management system. The FHWA provides resources and guidance.
  - http://www.fhwa.dot.gov/asset/guidance.cfm
- Coordinate with GIS specialists from the county and tribe for the asset management of the bridges

Emphasis Area 5: Schools and School Zones

School zones and routes are a priority for the Osage Nation. School parking lot improvements projects have been included within the LRTP and TIP.

Twenty school districts lie within the Osage Nation boundary. In 2015, the Tribe applied for safety funds to install safety features at school sites within ten Osage Nation school districts: Barnsdall, Hominy, McCord, Osage Hills, Pawhuska, Prue, Shidler, Skiatook, Woodland, Wynona. These features included crosswalks, solar powered LED lights and signs. While the perceived safety concerns were expressed, lack of local crash data prohibited the project from moving forward. Improving local crash data collection is a new emphasis area that will be pursued and is discussed as Emphasis Area 7.

Goal

The goal for this emphasis area is to ensure school zone safety for children and teachers and parents during school hours and events.

Strategies

Engineering:

- Improve local crash data collection
- Conduct school roadways safety audits
- Install crosswalks and other pedestrian safety countermeasures

Education:

- Integrate Safe Routes to School into school and tribal education program
- Offer safe driver training resources through existing tribal, local, and state programs
- Develop and encourage safety driving behaviors by building partnerships between the Tribe, county, towns, and school districts

Emphasis Area 6: Emergency Preparedness

Response times continue to be a cause for concern in rural areas due to remote locations, distance to hospitals, and lack of funding to keep up with technological advances. Certain challenges exist for rural 911 services providers: remote locations, distance to hospitals, and lack of funding to keep up with technological advances. Emergency responders experience hampered response times as the result of poor road conditions, flooding incidences, and structurally deficient bridges. The Oklahoma 9-1-1 Management Authority was created with the purpose to oversee development and operation of emergency 911 systems within the state (http://www.ok.gov/911/index.html).

Natural disasters in the form of flooding, tornadoes, wildfire, and earthquakes can strike throughout the year. Unfortunately, crisis events can also be triggered by human behavior and actions (e.g. active shooter, oil spills). Within the LRTP, the Osage Nation has included projects with the purpose of improving response times. The Osage Nation provides 24-hour numbers to community members and tribal members in need: family violence prevention, ON police department, and constituent services department. In June 2018, the Osage Nation partnered with the Crisis Text Line to bring text-based crisis intervention to the Tribe/County service area. The Osage Nation also has an Emergency Management

Program whose mission is to reduce the effects of man-made and natural disasters through planning, preparation, mitigation, and response to these emergency events. https://www.osagenation-nsn.gov/what-we-do/emergency-management.

Despite these efforts, EMS service areas and call responses still suffer in Osage County. These articles are examples of issues that Osage County has faced over the last several years:

- https://www.tulsaworld.com/communities/skiatook/news/ems-services-under-fire/article_0ff94d64-affd-5846-9e87-e613ca2d8daa.html
- https://www.pawhuskajournalcapital.com/news/20190515/roberts-reports-on-avant-emergency-call

Osage County is part of Region 2 of the Oklahoma EMS Service Calls Areas. According to the 2011-2015 Summary, Osage County experienced significant call volume increases and long response times typical of a rural area.

https://www.ok.gov/health2/documents/Oklahoma%20EMS%20Service%20CAll%20Summary_20112015_05142018.pdf

Goal

The goal for this emphasis area is to prepare for emergency events and reduce response times.

Strategies

Engineering:

- Development of emergency response plans based on the transportation network
- Development of asset management and GIS for use by authorized personnel
- Development of online resources for public use

Education:

- Coordination with the County and State / Grant opportunities
  - https://www.ok.gov/911/Programs/9-1-1_Grants/index.html
- Public outreach through traditional and modern methods
- Incorporate education outreach into existing programs and events

Enforcement:

- Purchase necessary hardware and software to aid law enforcement officials
- Train law enforcement officials in use of hardware and software

EMS:

- Purchase necessary hardware and software to aid emergency medical responders
- Train emergency medical responders in use of hardware and software

Emphasis Area 7: Local Crash Data Collection & Coordination

Improvements in local crash data reporting were identified at the safety update meeting. The lack of valid tribal crash data is a recognized national concern. Numerous efforts and tools have been and are currently being developed to improve reporting. Obstacles such as uniform crash data collection forms, equipment and software, and data sensitivity are gradually being overcome as awareness, funding, and training are made more available.

The lack of local crash data was evident by only two crashes being recorded in Pawhuska over a five-year period. Crash data also seemed to be underreported in the other towns throughout the Osage Nation boundaries. Officer Marchmont BigEagle, Assistant Police Chief of the Osage Nation, offered to follow up with the local law enforcement and to organize local crash data collection efforts.

The Pioneer Woman Mercantile is located right along US 60/SH 11 in downtown Pawhuska. This route is heavily traveled by heavy trucks transporting oil or other heavyweight loads. Vehicle and pedestrian safety are major concerns because of the parking along both sides of the street and because of the irregularity of the street network in the town of Pawhuska. As the headquarters and administrative home of the Osage Nation, the Tribe is about to receive even more recognition because of the book *Killers of the Flower Moon* (author: David Grann) that is currently being made into a movie, directed by Martin Scorsese and starring Robert DeNiro and Leonard DiCaprio. This best-selling book chronicles Osage murders and the birth of the FBI. During July 2019, as this safety plan update was being developed, the Tulsa World and other news sources confirmed that the movie will be filmed in Osage County.

A significant increase in ODOT traffic counts was expected for the Pawhuska area. The AADT (Annual average daily traffic) is the total volume of vehicle traffic on a highway or road for a year, averaged out for a day. ODOT's Strategic Asset & Performance Management (SAPM) Division, Traffic Management Branch, prepared the 2018 AADT maps. These estimates follow the procedures outlined in the FHWA's Traffic Monitoring Guide and AASHTO's Guidelines for Traffic Data Programs. While AADTs account for seasonal recreation variances, the presence of the Mercantile and known traffic increases do not appear to be reflected in the numbers (Figure 8, page 20). Inquiries were made of ODOT personnel regarding the AADT numbers. The most recent AADTs were performed in March 2017 and November 2017. It is possible that the analysis and records are not recent enough quite yet or that the dates of the traffic data collection do not properly account for the seasonal traffic. The empirical evidence of news stories and social media attests to the increased volume of visitors to the area. In addition to the Mercantile, hotels, restaurants, and other retail stores are increasing business. Pawhuska has been a small rural town that is now a nationally well-known destination.

The Tribal Transportation Safety website (http://www.tribalsafety.org/) offers resources and guides for safety data collection and analysis. http://www.tribalsafety.org/Resources/Safety-Data/Data-Collection.

The National Cooperative Highway Research Program (NCHRP) offers comprehensive guides for effective tribal crash reporting that includes self-assessment, communication strategies, crash data collection, and sharing polices. http://onlinepubs.trb.org/onlinepubs/webinars/160826.pdf.

NHTSA'S GO Teams provide resources and assistance to State traffic records professionals to better traffic records data collection, management, and analysis capabilities. https://one.nhtsa.gov/Data/Traffic-Records.

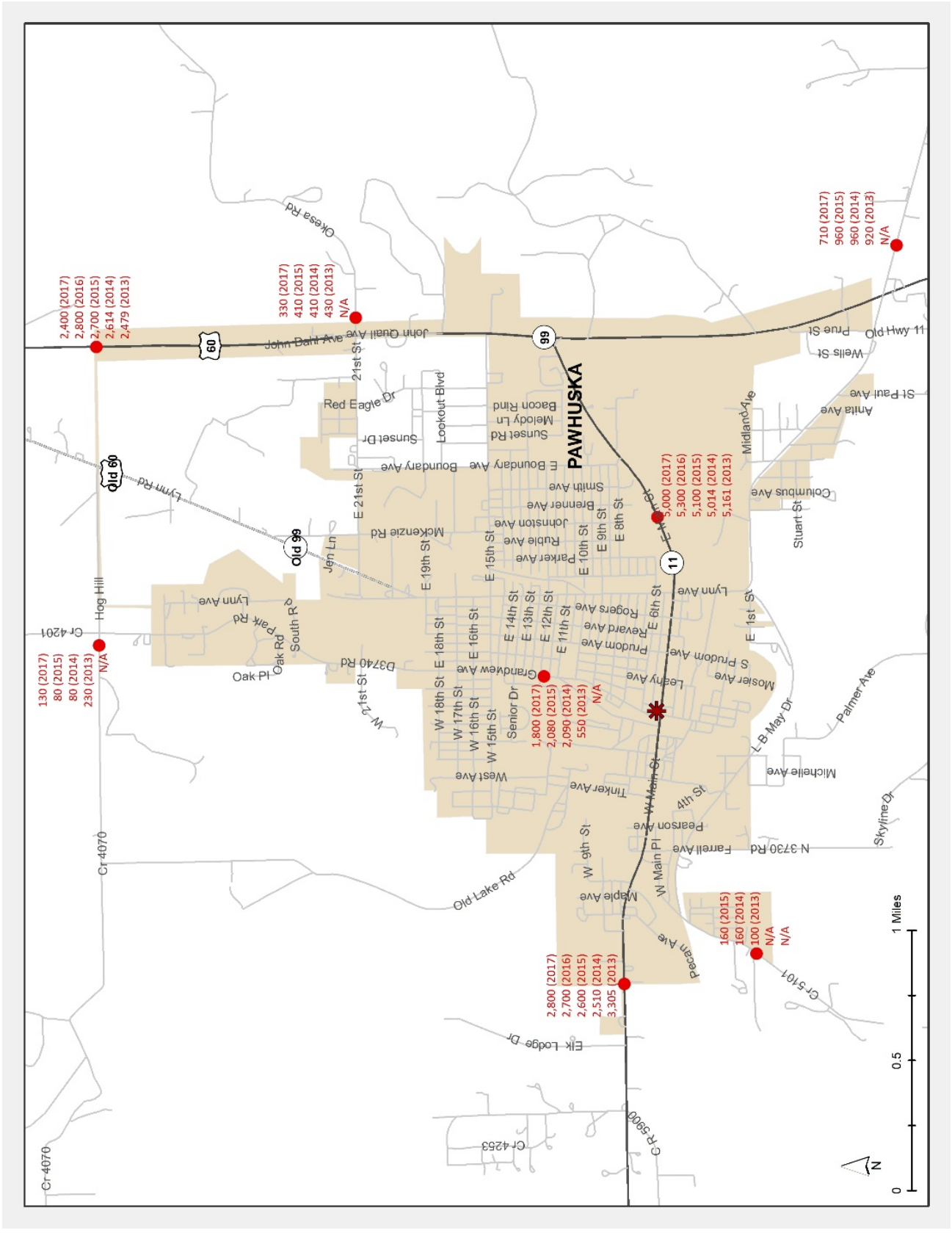


Figure 10. Pawhuska AADTs (source: ODOT)

Goals

The goals of this emphasis area are to collect and share incident and crash data from local law enforcement and to coordinate with ODOT for more accurate records, better problem identification, and competitive funding.

Strategies

Engineering:

- Conduct a traffic records assessment
  - http://www.trb.org/Publications/Blurbs/171540.aspx
- Develop minimum crash data collection standards for the Osage Nation
  - https://www.nhtsa.gov/research-data/traffic-records
- Collaborate with other law enforcement agencies, the Oklahoma Highway Safety Office, and the Oklahoma Department of Transportation
  - GO Teams
  - https://one.nhtsa.gov/Data/Traffic-Records
- Purchase of necessary hardware and software to improve crash and traffic data collection

Enforcement:

- Encourage collaboration and cooperation among law enforcement agencies
- Coordinate and implement resources from the Oklahoma Highway Safety Office
  - http://ohso.ok.gov/
- Training for hardware and software to improve crash and traffic data collection

Emphasis Area 8: Pedestrian Safety

As a small town that has recently seen a surge in local tourism, Pawhuska has the need to be a livable community where convenient transportation choices are provided to all citizens. Pedestrian and bicycle deaths have been rising across the country, and the Osage Nation and local community prefer to implement safety measures for the increased numbers of pedestrians. Many of the visitors are retired individuals and families with small children. The Osage Nation and the City of Pawhuska and the county commissioners are working together to ensure the safety of citizens and visitors to the area.

A representative from the Indian Nations Council of Governments (INCOG) was present at the meeting. INCOG is a voluntary association of local and tribal governments in the Tulsa metropolitan area in northeast Oklahoma. INCOG provides planning and coordination services for transportation, planning, and land development and works with the Cherokee Nation, the Muscogee (Creek) Nation, and the Osage Nation. With INCOG, The Osage Nation applied for a Rural Planning Grant for the Osage Prairie Trail to connect Skiatook and Pawhuska. The Osage Prairie Trail currently extends 16.3 miles from Tulsa to Skiatook as part of the Tulsa Regional Trails. The proposed trail extension will connect rural communities within the Osage Nation: Skiatook to Avant to Barnsdall to Nelagoney to Pawhuska. As such, safety countermeasures should be incorporated as appropriate for the pedestrian crossings and daily use.

http://www.incog.org/Transportation/TrailInformation/Osage/osageprairie.htm
http://www.incog.org/transportation/BUILDgrants/OsageNation/Application%20Narrative.pdf

Goal

The goal of this emphasis area is to develop the Osage Nation as a livable, walkable, and safe community to accommodate current residents and the growing number of visitors.

Strategies

Engineering:

- Research various pedestrian crossings and implement the best option into design plans. The FHWA's Office of Planning has a Pedestrian and Bicycle Program.
    - http://www.fhwa.dot.gov/planning/processes/pedestrian_bicycle/
- Follow planning guidelines as provided by the FHWA in the Statewide Pedestrian and Bicycle Planning Handbook
    - https://www.planning.dot.gov/documents/Ped-Bike_State_Planning_Handbook.pdf
- Future road improvements should account for pedestrian/bicycle use and safety

Education:

- Integrate pedestrian and bicycle safety into existing community programs
- Develop tribal programs focused on pedestrian and bicycle safety for both drivers and non-drivers
- Develop public outreach/education based on anticipated increases in tourism and recreational use

Enforcement:

- Develop cooperative working agreements to cover future pedestrian/bicycle expansion areas
- Increase tribal and/or county law enforcement numbers to cover new areas

EMS:

- Plan for new routes, services, and personnel to cover the increase of potential emergencies at new recreational facilities

Summary of Emphasis Areas (2019)

The emphasis areas, goals, and strategies for the Osage Nation Transportation Safety Plan (2019) Update have been reorganized and updated to represent the tribal transportation safety concerns of the Osage Nation. The table below provides a summary of the new emphasis areas.

Table 2. Emphasis Areas (2019) Summary Table

Emphasis Area	Strategies	4 Es	Performance Measures
Roadway Departure Crash Reductions	• Road Safety Audits • Roadway Departure Strategic Plan • FHWA Proven Countermeasures • Systemic Approach • Placement of speed deterrents	• Engineering • Enforcement • Education	• Road improvement projects • Collision reductions • Public observations • Drivers' education programs
Critical Locations	• Road Safety Audits • Roadway Departure Strategic Plan • FHWA Proven Countermeasures • Systemic Approach • Placement of speed deterrents	• Engineering • Enforcement • Education	• Road improvement projects • Collision reductions • Public observations • Drivers' education programs
Heavy Truck Traffic	• Oklahoma Department of Public Safety • Designated truck routes • Coordination with ODOT / OHP / DPS	• Engineering • Education • Enforcement	• Public observations • Check points • Coordination with ODOT
Bridges Evaluation	• National Bridge Inventory • Coordination with ODOT and Osage County • Public outreach	• Engineering	• Bridge asset management • Bridge improvements
School Zone Safety	• Improve local crash data collection • Conduct school roadways safety audits • Install crosswalks & safety countermeasures • Offer safety driver & pedestrian programs	• Engineering • Education	• School safety programs • School zone improvements • Pursuance of other sources of funding
Emergency Preparedness	• Coordination of emergency response agencies • Development of GIS resources • Public outreach & programs • Equipment purchase & trainings	• Engineering • Education • Enforcement • EMS	• Reduced response times • GIS online services • Tribal/county wide integrated plans
Local Crash Data Collection and Coordination	• Traffic records assessment • Coordination & collaboration with local law enforcement and ODOT • Equipment & software - purchase & trainings	• Engineering • Enforcement	• Improved crash and traffic data collection • Pursuance of other sources of funding
Pedestrian Safety	• Collaboration among agencies: Osage Nation, county, INCOG • Research & implement pedestrian crossing and safety countermeasures • Develop outreach/education programs for growing numbers of visitors	• Engineering • Education • Enforcement • EMS	• Public outreach campaigns • Public observation • Installation of pedestrian crossings

Conclusion

This STSP update is a dynamic document that will be adapted as needs changes because of roadway improvements, legislation changes, and technological advancements. The emphasis areas of the Strategic Transportation Safety Plan Update were identified by available crash data and through the discussions of the Osage Nation leaders and stakeholders with a vested interest. The goals of this transportation safety plan are to increase safety on the roadways through engineering improvements, collaboration and cooperation among the Osage Nation and the local, county, and state agencies, and to develop educational programs that promote safe driving practices.

Sources and Guidance

Federal Highway Administration. Tribal Transportation Safety Plans. U.S. Department of Transportation. https://flh.fhwa.dot.gov/programs/ttp/safety/plans.htm

Federal Highway Administration. Office of Safety. U.S Department of Transportation. http://safety.fhwa.dot.gov.

Oklahoma Department of Transportation. Statewide Analysis for Engineering & Technology (SAFE-T). http://www.oksafe-t.org.

Tribal Transportation Safety. http://www.tribalsafety.org/

Preparation of Document

Pamela D. Jurney, GISP
Project Manager, Cross Timbers Consulting, LLC
pamela.jurney@crosstimbersconsulting.com

Appendix A

Osage Nation Safety Plan Update (2019)

Safety Planning Meeting

Osage Nation

Transportation Safety Plan Update Meeting

July 10, 2019

- Update vision state: include visitors traveling through or traveling within Osage Nation
- Review summary table of emphasis areas & locations of concern
- Discuss new concerns, potential new emphasis area

Notes

- Local crash data – improve local crash data reporting
    - Officer Bigeagle look into obtaining crash data
- Increase of recreation / tourism in Pawhuska
    - Visitors unfamiliar with area
    - Driving on gravel roads, especially toward Tallgrass Prairie
    - Future development
        - Hotel chains? More businesses
    - Drummond Ranch traffic
    - Traffic counts?
- Critical locations
    - SH 18 south of Shidler
        - Terrain changes
    - Skiatook location
        - Efforts being made, issues with ROW
- School zones
    - Safety improvements
        - Sidewalks
- Pedestrian activity
    - Osage Prairie Trail
- Road safety audits
- Safety countermeasures
    - Systemic approach

Osage Nation Roads Department

07/10/2019 Strategic Transportation Safety Plan Update Meeting

Name	Signature	Company	Phone	email
Justin Carr		Osage Nation Roads Dept.	(918) 287 - 5204	jjcarr@osagenation-nsn.gov
Jody Burd		Osage Nation Roads Dept.	(918) 287 - 5387	tburd@osagenation-nsn.gov
Harold LaSarge	[illegible]	Osage Nation Roads Dept.	(918) 287 - 5533	hlasarge@osagenation-nsn.gov
Pamela Jurney	[illegible]	Cross Timbers Consulting,LLC	(405) 255 - 6999	pamela.jurney@crosstimbersconsulting.com
Kanny Jump	[illegible]	Osage County	(918) 287-3334	osagecc123@yahoo.com
M. B. Eagle	[illegible]	ONRD	(918) 287-5510	mbeagle@osagenation-nsn.gov
Chase Phillips	[illegible]	INCOG	(405) 496-4272	cphillips@incog.org
Anthony Hudson	[illegible]	Osage County Dist 1	(918) 277-5590	osage1@yahoo.com
Kelly Corbin	[illegible]	Osage Cty, Dist. #1	(918) 629-1612	krcorbin1@outlook.com
Ted Smith	[illegible]	Osage D#3	(918) 446-9187	TedS Smith.200@icloud.com
Darren McKinney	[illegible]	Osage D#3	(918) 373-5002	dmack.14dm@gmail.com
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Appendix B
Osage Nation Emphasis Area Review

Osage Nation Emphasis Areas Review

Emphasis Area: General Road Network

Road Geometry Deficiencies

Unlike other counties in Oklahoma, the roads within Osage County were not built along section lines which affects the angles of intersections throughout the county. The Osage Nation intends to partner for the improvements of local and county-wide roadways as opportunities present themselves. At the safety update meeting, the discussion centered on what critical crash locations, contributing factors, and realistic efforts that can be devoted to improving roadways. The roadways of most concern are discussed further in the critical locations analysis.

Asset Management

The Osage Nation roads department is focused on safe and efficient modes of transportation. The Osage Nation NTTFI is maintained and updated. The LRTP and TTIP are open to public comment and under the development and revision of the Roads Department Planner as appropriate.

Speed Deterrents

Speed is always a pressing issue. The Osage Nation supports and is willing to implement safety countermeasures where appropriate and applicable especially in construction zones.

The Osage Nation intends to use available collision data to guide efforts to correct Road Geometry Deficiencies. These concerns are now addressed within Emphasis Areas 1 (Roadway Departure Crashes), 2 (Critical Locations), and 7 (Improve Local Crash Data Collection).

Emphasis Area: Heavy Truck Traffic

Due to the oil fields, rock quarries, and wind farms, Osage County experiences a large volume of heavy truck traffic. The county commissioners and Osage Nation roads department expressed concern for the deleterious effects of heavy truck traffic on the bridges throughout the county.

Continued efforts will be pursued as Emphasis Area 3 (Heavy Truck Traffic).

Emphasis Area: Bridges and Flooding

Flooding is not so much a concern as is the deteriorating conditions of the bridges and heavy truck traffic experienced by them. In Osage County, ODOT records show 274 off-system bridges.

Modifications and efforts are addressed within Emphasis Area 4 (Bridges Evaluation).

Emphasis Area: Walkable and Livable Communities / Pedestrians

As a small town that has recently seen a surge in local tourism, Pawhuska has the need to be a livable community where convenient transportation choices are provided to all citizens. Pedestrian and bicycle

deaths have been rising across the country, and the Osage Nation and local community prefer to implement safety measures rather than report pedestrian collision statistics.

Modification and efforts are addressed within Emphasis Area 8 (Pedestrian Safety).

Emphasis Area: Elderly Care

This emphasis area has been removed from the transportation safety update because it was generally felt that the elders of the Osage Nation and local communities are adequately cared for and the data does not support the concern that elders are at risk within the transportation network.

Emphasis Area: Recreation and Entertainment

Lakes: The results of the meeting seem to indicate that transportation safety is not a concern beyond what was already expressed as far as promoting safe driving behaviors, collaboration among agencies, and continuing efforts to reduce response times.

Casinos: Other than typical fender-bender collisions, the casinos are not seen as a cause for serious transportation safety concerns.

This emphasis area has been incorporated into other emphasis areas to reflect the concerns resulting from increased tourism in the area.

Emphasis Area: Emergency Preparedness

Response times continue to be a cause for concern in rural areas due to remote locations, distance to hospitals, and lack of funding to keep up with technological advances. Within the LRTP, the Osage Nation has included projects with the purpose of improving response times. The Osage Nation also has an Emergency Management Program whose mission is to reduce the effects of man-made and natural disasters through planning, preparation, mitigation, and response to these emergency events.

https://www.osagenation-nsn.gov/what-we-do/emergency-management

This emphasis area has been retained as it is mentioned in the national transportation safety plan and the continuous efforts to save lives.

Emphasis Area: Schools and School Zones

School zones and routes are a priority for the Osage Nation. School parking lot improvements projects have been included within the LRTP and TIP.

Twenty school districts lie within the Osage Nation boundary. In 2015, the Tribe applied for safety funds to install safety features at school sites within ten Osage Nation school districts: Barnsdall, Hominy, McCord, Osage Hills, Pawhuska, Prue, Shidler, Skiatook, Woodland, Wynona. These features included crosswalks, solar powered LED lights and signs. While the perceived safety concerns were expressed, lack of local crash prohibited the project from moving forward.

This emphasis area has been retained because school zone safety is a priority for the Osage Nation and ties into pedestrian safety.

Critical Locations

In the original STSP, a spatial-outlier analysis was run on the severity of collisions to identify clusters of severe collisions. Six critical locations were identified. While these areas are causes for concern, they lie outside of the transportation safety purview of the Osage Nation. However, the Osage Nation would be willing to partner for roadway improvements. Two of the roadways identified as critical locations are part of ODOT's 8-year work plan (2019-2026). Critical location 3, SH 11 outside of Barnsdall, is scheduled for right-of-way, utilities, and grade, drain, and bridge. Critical location 4, SH 20 into Skiatook, is scheduled for right-of-way, utilities, and widen, resurface, and bridge.

Site-Specific Locations

Site-specific locations are those that were identified at the transportation safety planning meeting that was held in June of 2014. These roadways are known for their geometric deficiencies such as narrow roadways, skewed intersections, and/or limited sight distances. Each of the site-specific locations will be reexamined and reevaluated based on the recent crash data and discussions at the transportation safety update meeting.

SH 11 – Dog Thresher Road: blind intersection / sign deficiencies

This critical location is listed on ODOT's work plan; therefore, the needs and concerns for this location are being addressed by the state.

SH 18 – South of Shidler

This 9-mile stretch of roadway is still a cause for concern, and the intersection of SH 18 and Old Hwy 60 is of special concern. South of Shidler, the topography drastically changes, and the road becomes winding with many vertical curves.

Grandview & Kihekah Avenues (Pawhuska)

These two streets merge at the top of the hill at the Osage Nation tribal complex. No collisions are reported in 2014-2018 dataset; in fact, only two collisions were reported in Pawhuska for this time frame. At the meeting, Officer Eagle of the Osage Nation police department said that he would look into collecting local crash data.

52nd W Ave at 133rd N (Skiatook)

This location in southwest Skiatook is still a major concern. Sixteen collision are recorded on the north and east of the curve with seven collisions occurring along the curve. This location remains an area of roadway safety concern for the Osage Nation.

Rock School Road

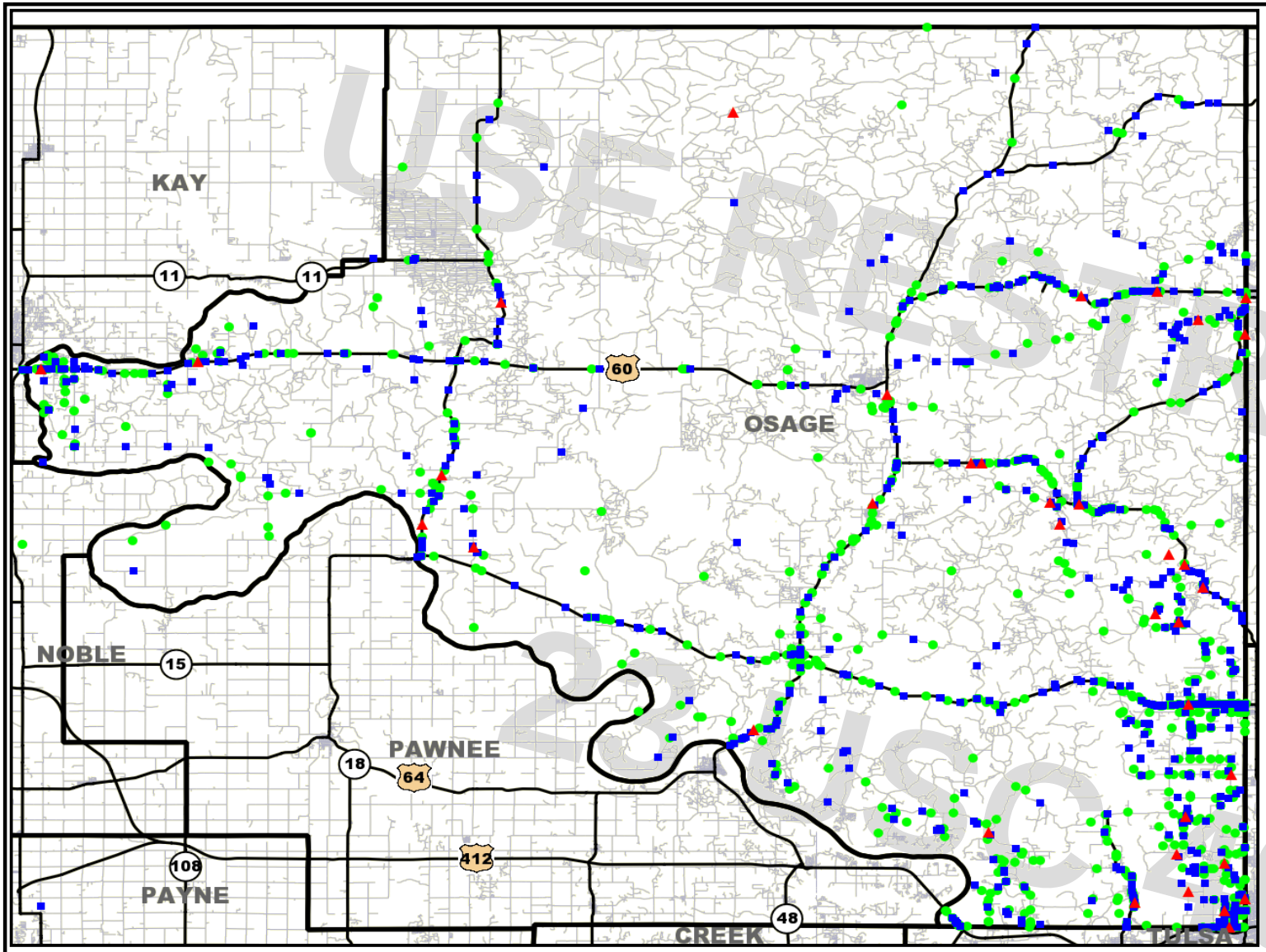
This roadway, north of Sand Springs, is no longer a cause for concern. Road improvements have taken place and only a few PDO collisions along occurred along the roadway.

SH 20 into Skiatook

This critical location is listed on ODOT's work plan; therefore, the needs and concerns for this location are being addressed by the state.

Appendix C

Crash Data Report (2014 – 2018)



Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 06/30/2019
by Pamela Jurney

Study Map & Totals

Legend

- Fatality
- Injury
- Property Damage

N
W E
S

Remarks:

2014-2018

OSAGE NATION

132 NONMAPPABLE COLLISIONS **

Date Range: 01-01-2014 thru 12-31-2018

	2014						2015						2016					
	Fat	Incap Inj	Non-Incap Inj	Poss Inj	PD	Tot	Fat	Incap Inj	Non-Incap Inj	Poss Inj	PD	Tot	Fat	Incap Inj	Non-Incap Inj	Poss Inj	PD	Tot
Collisions	5	16	53	92	205	371	8	29	69	61	253	420	8	29	48	67	211	363
Persons	5	21	74	125		225	8	33	91	94		226	8	35	62	88		193

STUDY TOTALS (CONT.)

OSAGE NATION

Date Range: 01-01-2014 Thru 12-31-2018

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 06/30/2019 by Pamela Jurney

	2017						2018*					
	Fat	Incap Inj	Non-Incap Inj	Poss Inj	PD	Tot	Fat	Incap Inj	Non-Incap Inj	Poss Inj	PD	Tot
Collisions	10	25	57	78	244	414	7	22	58	57	207	351
Persons	12	29	85	124		250	9	27	82	86		204

*** DENOTES A YEAR FOR WHICH DATA MAY BE INCOMPLETE.**

	Study Total					
	Fatality	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	Property Damage	Total
Collisions	38	121	285	355	1120	1919
Persons	42	145	394	517		1098

**** NONMAPPABLE COLLISIONS ARE NOT PLOTTED ON THE MAP DUE TO INSUFFICIENT LOCATION INFORMATION.**

STUDY TOTALS - BY CITY AND HWY CLASS

OSAGE NATION

Date Range: 01-01-2014 Thru 12-31-2018

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 06/30/2019 by Pamela Jurney

STUDY TOTALS

	HIGHWAY COLLISIONS				CITY STREET COLLISIONS				COUNTY ROAD COLLISIONS				TOTAL COLLISIONS			
Year	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
2014	1	80	106	187	1	19	41	61	3	62	58	123	5	161	205	371
2015	5	75	120	200	1	33	55	89	2	51	78	131	8	159	253	420
2016	3	70	94	167		24	42	66	5	50	75	130	8	144	211	363
2017	5	78	125	208	2	26	28	56	3	56	91	150	10	160	244	414
2018 *	3	63	97	163	1	19	42	62	3	55	68	126	7	137	207	351
Total:	17	366	542	925	5	121	208	334	16	274	370	660	38	761	1120	1919

*** DENOTES A YEAR FOR WHICH DATA MAY BE INCOMPLETE.**

County: (36) KAY

	HIGHWAY COLLISIONS				CITY STREET COLLISIONS				COUNTY ROAD COLLISIONS				TOTAL COLLISIONS			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
(00) - RURAL -										2	1	3		2	1	3

County: (57) OSAGE

	HIGHWAY COLLISIONS				CITY STREET COLLISIONS				COUNTY ROAD COLLISIONS				TOTAL COLLISIONS			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
(00) - RURAL -	13	277	321	611					16	270	367	653	29	547	688	1264
(05) BARTLESVILLE	1	2	8	11		1	1	2					1	3	9	13
(10) BARNSDALL			1	1											1	1
(20) FAIRFAX	1	1	5	7		2	9	11					1	3	14	18
(35) HOMINY		5	17	22		4	14	18						9	31	40
(40) OSAGE							5	5							5	5
(45) PAWHUSKA	1			1		1	3	4					1	1	3	5
(49) SAND SPRINGS					1	4	5	10					1	4	5	10
(50) SHIDLER			2	2											2	2
(55) WEBB CITY						1		1						1		1
(60) WYNONA			2	2			3	3							5	5
(70) SKIATOOK	1	80	183	264		18	69	87					1	98	252	351
(80) TULSA					2	39	47	88					2	39	47	88
Total:	17	365	539	921	3	70	156	229	16	270	367	653	36	705	1062	1803

County: (59) PAWNEE

	HIGHWAY COLLISIONS				CITY STREET COLLISIONS				COUNTY ROAD COLLISIONS				TOTAL COLLISIONS			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot

*** INCLUDES INCAPACITATING, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 06/30/2019 by Pamela Jurney

OSAGE NATION

	HIGHWAY COLLISIONS				CITY STREET COLLISIONS				COUNTY ROAD COLLISIONS				TOTAL COLLISIONS			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
(00) - RURAL -											1	1			1	1

County: (72) TULSA

	HIGHWAY COLLISIONS				CITY STREET COLLISIONS				COUNTY ROAD COLLISIONS				TOTAL COLLISIONS			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
(00) - RURAL -										2	1	3		2	1	3
(50) TULSA					2	50	49	101					2	50	49	101
(70) SKIATOOK		1	3	4		1	3	4						2	6	8
Total:		1	3	4	2	51	52	105		2	1	3	2	54	56	112

* INCLUDES INCAPACITATING, NON-INCAPACITATING, AND POSSIBLE INJURIES.

TABULATION OF COLLISIONS

OSAGE NATION

Date Range: 01-01-2014 Thru 12-31-2018

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 06/30/2019 by Pamela Jurney

Collisions By Type Of Collision

Type Of Collision	2014				2015				2016				2017				2018*			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
Rear-End (front-to-rear)		12	27	39		17	35	52		18	37	55		12	34	46		15	22	37
Head-On (front-to-front)		11	2	13		5	3	8		2	2	4	4	3	3	10		3	1	4
Right Angle (front-to-side)	1	13	16	30	1	11	18	30		10	14	24		12	9	21	2	12	17	31
Angle Turning		7	30	37	3	22	37	62		15	27	42	1	28	43	72		17	38	55
Other Angle															2	2			1	1
Sideswipe Same Direction		1	5	6		3	7	10		1	6	7		1	7	8			7	7
Sideswipe Opposite Direction		6	8	14		3	12	15	1	2	5	8		4	7	11	1	5	3	9
Fixed Object	2	72	71	145	3	57	79	139	5	56	76	137	3	58	82	143	3	60	74	137
Pedestrian					1	6		7		1		1		4	1	5				
Pedal Cycle						4		4		2		2	1	2		3			1	1
Animal	1	2	18	21		4	13	17		6	13	19		5	19	24		4	13	17
Overturn/Rollover	1	30	8	39		20	10	30	2	25	14	41	1	28	9	38		18	10	28
Vehicle-Train																				
Other Single Vehicle Crash		3		3		2	5	7		1		1			3	3				
Other		4	20	24		5	34	39		5	17	22		3	25	28	1	3	20	24
Total	5	161	205	371	8	159	253	420	8	144	211	363	10	160	244	414	7	137	207	351
Percent	0.3	8.4	10.7	19.3	0.4	8.3	13.2	21.9	0.4	7.5	11.0	18.9	0.5	8.3	12.7	21.6	0.4	7.1	10.8	18.3

Collisions By Type Of Collision

Type Of Collision	Total				
	Fat	Inj *	PD	Tot	Pct
Rear-End (front-to-rear)		74	155	229	11.9
Head-On (front-to-front)	4	24	11	39	2.0
Right Angle (front-to-side)	4	58	74	136	7.1
Angle Turning	4	89	175	268	14.0
Other Angle			3	3	0.2
Sideswipe Same Direction		6	32	38	2.0
Sideswipe Opposite Direction	2	20	35	57	3.0
Fixed Object	16	303	382	701	36.5
Pedestrian	1	11	1	13	0.7
Pedal Cycle	1	8	1	10	0.5
Animal	1	21	76	98	5.1
Overturn/Rollover	4	121	51	176	9.2
Vehicle-Train					
Other Single Vehicle Crash		6	8	14	0.7
Other	1	20	116	137	7.1
Total	38	761	1120	1919	100
Percent	2.0	39.7	58.4	100	

*** INCLUDES INCAPACITATING, NON-INCAPACITATING, AND POSSIBLE INJURIES.**

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 06/30/2019 by Pamela Jurney

Units By Unit Type

Unit Type	2014				2015				2016				2017				2018*			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
Train																				
Pedestrian		1		1	1	6		7		3		3		5	1	6				
Animal	1	2	16	19		4	13	17		6	12	18		4	19	23		3	13	16
Pedal Cycle						5		5		2		2	1	2		3			1	1
Parked Vehicle		2	5	7		1	13	14		3	2	5			8	8		2	7	9
CMV		8	19	27		7	16	23	1	5	6	12	1	6	14	21	1	9	11	21
Other Single Vehicle	4	104	92	200	4	93	100	197	7	91	105	203	5	95	111	211	3	79	104	186
Other Multi-Vehicle	2	102	199	303	9	127	280	416	1	100	204	305	9	127	241	377	7	104	189	300
Total	7	219	331	557	14	243	422	679	9	210	329	548	16	239	394	649	11	197	325	533
Percent	0.2	7.4	11.2	18.8	0.5	8.2	14.2	22.9	0.3	7.1	11.1	18.5	0.5	8.1	13.3	21.9	0.4	6.6	11.0	18.0

Units By Unit Type

Unit Type	Total				
	Fat	Inj *	PD	Tot	Pct
Train					
Pedestrian	1	15	1	17	0.6
Animal	1	19	73	93	3.1
Pedal Cycle	1	9	1	11	0.4
Parked Vehicle		8	35	43	1.4
CMV	3	35	66	104	3.5
Other Single Vehicle	23	462	512	997	33.6
Other Multi-Vehicle	28	560	1113	1701	57.3
Total	57	1108	1801	2966	100
Percent	1.9	37.4	60.7	100	

* INCLUDES INCAPACITATING, NON-INCAPACITATING, AND POSSIBLE INJURIES.

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 06/30/2019 by Pamela Jurney

Vehicles By Vehicle Type

Vehice Type	2014				2015				2016				2017				2018*			
	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot	Fat	Inj *	PD	Tot
Passenger Vehicle-2 Door		11	24	35		6	25	31		9	20	29		10	27	37		7	12	19
Passenger Vehicle-4 Door	2	61	108	171	3	49	154	206	3	49	110	162	3	59	134	196	5	55	123	183
Passenger Vehicle-Convertible		1	1	2		1		1			1	1							1	1
Pickup Truck	1	43	120	164	1	47	165	213	1	43	115	159	2	44	132	178	2	32	107	141
Single-Unit Truck (2 axles)			2	2			5	5		1	1	2		1	4	5			7	7
Single-Unit Truck (3 or more axles)		1	2	3		1	4	5		2	3	5		1	5	6		2	1	3
School Bus							3	3											1	1
Truck/Trailer		2	9	11			6	6			2	2		1	3	4			4	4
Truck-Tractor (bobtail)		1		1		1	1	2											1	1
Truck-Tractor/Semi-Trailer		3	11	14			6	6			4	4		2	6	8		3	4	7
Truck-Tractor/Double															1	1				
Truck-Tractor/Triple																			1	1
Bus/Large Van (9-15 seats)			1	1																
Bus (16+ seats)																				
Motorcycle	1	9	3	13	2	22	4	28	3	11	2	16	1	12	5	18	1	11		12
Motor Scooter/Moped										1		1						2		2
Motor Home											1	1							1	1
Farm Machinery							2	2												
ATV											1	1						1		1
Sport Utility Vehicle (SUV)		33	54	87	1	36	74	111	1	34	80	115	4	42	83	129		36	66	102
Passenger Van	1	5	9	15		4	8	12		1	6	7		2	12	14		3	7	10
Truck More Than 10,000 lbs.			2	2			1	1			1	1		1	1	2				
Van (10,000 lbs. or less)		4	3	7		2	4	6		1	6	7	1	2	3	6			9	9
Other			9	9			12	12			12	12			13	13			11	11
Total	5	174	358	537	7	169	474	650	8	152	365	525	11	177	429	617	8	152	356	516
Percent	0.2	6.1	12.6	18.9	0.2	5.9	16.7	22.8	0.3	5.3	12.8	18.5	0.4	6.2	15.1	21.7	0.3	5.3	12.5	18.1

* INCLUDES INCAPACITATING, NON-INCAPACITATING, AND POSSIBLE INJURIES.

Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 06/30/2019 by Pamela Jurney

Vehicles By Vehicle Type

Vehice Type	Total				
	Fat	Inj *	PD	Tot	Pct
Passenger Vehicle-2 Door		43	108	151	5.3
Passenger Vehicle-4 Door	16	273	629	918	32.3
Passenger Vehicle-Convertible		2	3	5	0.2
Pickup Truck	7	209	639	855	30.1
Single-Unit Truck (2 axles)		2	19	21	0.7
Single-Unit Truck (3 or more axles)		7	15	22	0.8
School Bus			4	4	0.1
Truck/Trailer		3	24	27	0.9
Truck-Tractor (bobtail)		2	2	4	0.1
Truck-Tractor/Semi-Trailer		8	31	39	1.4
Truck-Tractor/Double			1	1	
Truck-Tractor/Triple			1	1	
Bus/Large Van (9-15 seats)			1	1	
Bus (16+ seats)					
Motorcycle	8	65	14	87	3.1
Motor Scooter/Moped		3		3	0.1
Motor Home			2	2	0.1
Farm Machinery			2	2	0.1
ATV		1	1	2	0.1
Sport Utility Vehicle (SUV)	6	181	357	544	19.1
Passenger Van	1	15	42	58	2.0
Truck More Than 10,000 lbs.		1	5	6	0.2
Van (10,000 lbs. or less)	1	9	25	35	1.2
Other			57	57	2.0
Total	39	824	1982	2845	100
Percent	1.4	29.0	69.7	100	

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Program Provided by:
Traffic Engineering Division
Collision Analysis and Safety Branch
(405) 522-0985
Created: 06/30/2019 by Pamela Jurney

Day And Time Of Occurrence Of Collisions

Day	Hour Of The Day																								
	AM												PM												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	Tot	Pcnt
Sunday	13	5	3	8	3	11	4	7	10	11	8	11	21	18	14	16	18	18	15	10	12	7	8	18	269	14.0
Monday	2	3	2	2	4	7	17	14	10	15	13	5	15	14	19	18	13	17	11	9	11	13	4	8	246	12.8
Tuesday	3	3		2	7	12	17	16	12	14	15	13	11	12	15	20	22	20	13	15	14	5	9	6	276	14.4
Wednesday	2	4		2	2	8	13	10	6	7	11	12	10	14	19	22	17	15	10	15	12	8	3	8	230	12.0
Thursday	1	1		4	5	9	12	7	4	11	14	12	17	15	24	21	14	23	15	13	11	9	4	7	253	13.2
Friday	2	10	3	3	5	11	20	12	13	20	10	15	20	20	30	13	21	22	18	22	19	14	10	14	348	18.1
Saturday	6	4	3	3	4	9	7	8	12	11	14	16	13	21	23	14	19	15	14	19	15	19	13	15	297	15.5
	Early Morning - Sunrise						Morning Peak			Mid Morning/Afternoon						PM Peak			Evening - Late Night						Tot	100
Total	191						231			623						378			496						1919	
Percent	10.0						12.0			32.5						19.7			25.8						100	

Roadway/Lighting

Roadway Conditions	Lighting Conditions					Total	Percent
	Daylight	Darkness	Twilight	Lighted	Unknown		
Dry	977	405	94	76	4	1556	81.1
Wet (Water)	142	79	20	10	1	252	13.1
Ice, Snow, or Slush	47	21	5	1		74	3.9
Mud, Dirt, Gravel, or Sand	17	12				29	1.5
Other		3			5	8	0.4
Total	1183	520	119	87	10	1919	100
Percent	61.6	27.1	6.2	4.5	0.5	100	

Weather Conditions

Weather Conditions	Total	Percent
Clear	1343	70.0
Clouds Present	325	16.9
Raining/Fog	194	10.1
Snowing/Sleet/Hail	43	2.2
Other	14	0.7
Total	1919	100

Program Provided by:
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Drivers By Driver Conditions

Unsafe/Unlawful	Apparently Normal			Alcohol Involved						Sleep Suspected			Drug Use Indicated			Unknown Condition			Total				
				Ability Impaired			Odor Detected																
	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Fat	Inj *	PD	Total	Pcnt
Failed to Yield		2	2					2							1			1		4	4	8	0.3
Failed to Stop	2	84	131			1		2			1	1	1			1	11	19	4	98	152	254	9.1
Failed to Signal	2	11	18		1	1					1	1					3	7	2	16	27	45	1.6
Improper Turn		1																		1		1	
Improper Start	1	27	58			1			1				1				4	9	2	31	69	102	3.6
Improper Stop		2	2																	2	2	4	0.1
Improper Backing		1	4														1			2	4	6	0.2
Improper Parking		4	27						1									5		4	33	37	1.3
Improper Passing		2	4																	2	4	6	0.2
Improper Lane Change		7	23															3		7	26	33	1.2
Left of Center		3	10												1					3	11	14	0.5
Following Too Close		20	39		1						2			1		3	3	9	3	27	48	78	2.8
Unsafe Speed		16	36					1									2	5		19	41	60	2.1
DWI	4	179	149			2	4	4	5		3					3	12	27	11	198	183	392	14.0
Inattention		2	1	1	51	80	2	21	19				5	34	34	1	1	2	9	109	136	254	9.1
Negligent Driving	1	105	152		1	2		3	4		28	17		1		1	10	14	2	148	189	339	12.1
Defective Vehicle		10	27															8		10	35	45	1.6
Wrong Way		16	24									1						3		16	28	44	1.6
No Improper Action			1															1			2	2	0.1
Other	11	317	610					1	2			1		1	1	3	7	24	14	326	638	978	34.9
Total	23	829	1346	1	54	88	6	36	32		35	22	7	37	37	17	66	166	54	1057	1691	2802	100
Percent	0.8	29.6	48.0		1.9	3.1	0.2	1.3	1.1		1.2	0.8	0.2	1.3	1.3	0.6	2.4	5.9	1.9	37.7	60.3	100	

Severities Indicate Highest Severity in Collision

Collisions By Special Feature

Special Feature	Total			
	Fat	Inj *	PD	Tot
Bridge		11	10	21
Work Zone		8	13	21
Cross Median		3	1	4
Train Collision				

* INCLUDES INCAPACITATING, NON-INCAPACITATING, AND POSSIBLE INJURIES.

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ROADWAY / REGION

QUERY OVER	SELECTIONS

DATE

Date Range	01-01-2014 to 12-31-2018

FILTER COLLISIONS

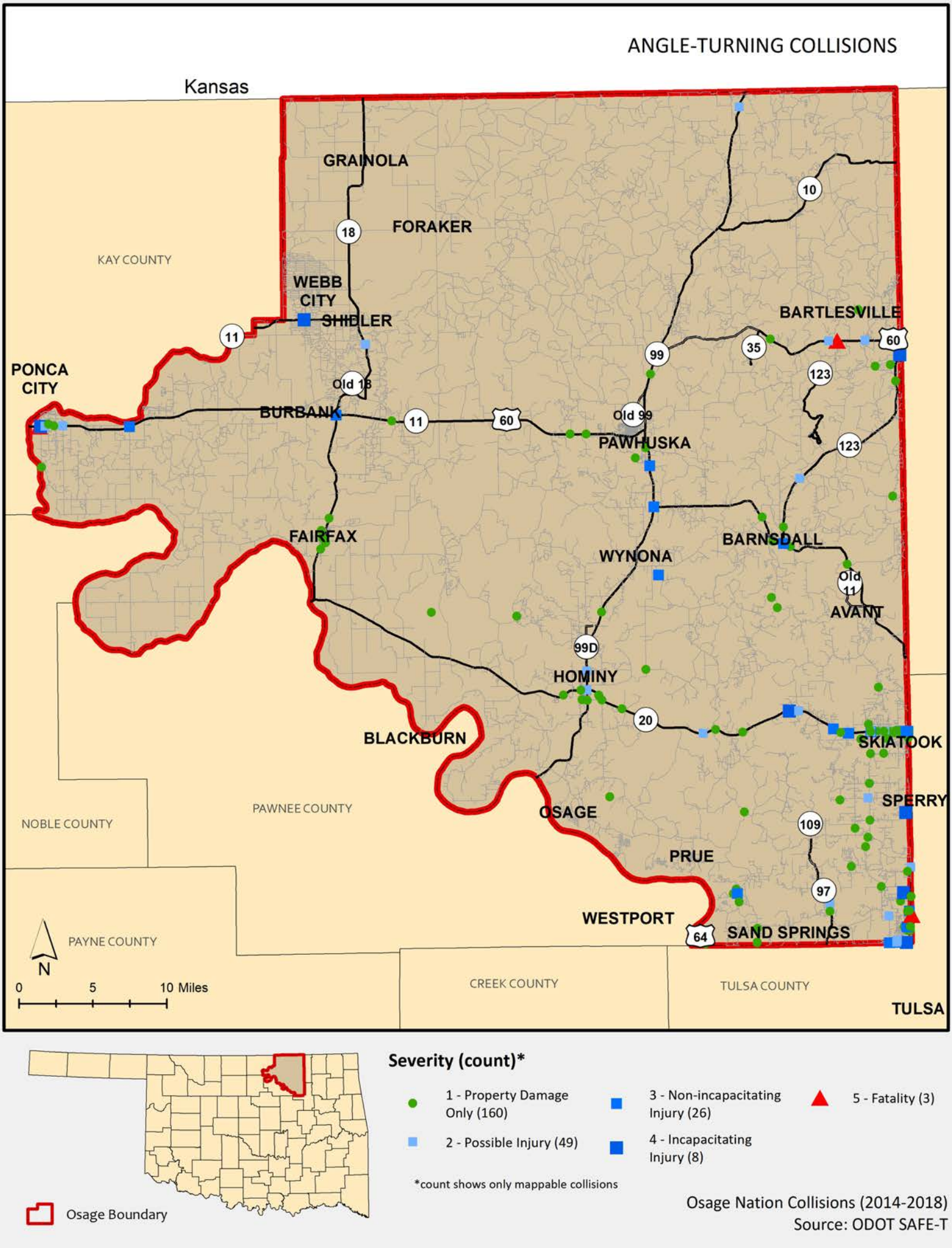
Roadway Type	All Collision Data
Incl. Crashes Assoc. w/ Every Int.	Checked
Environment Fields	

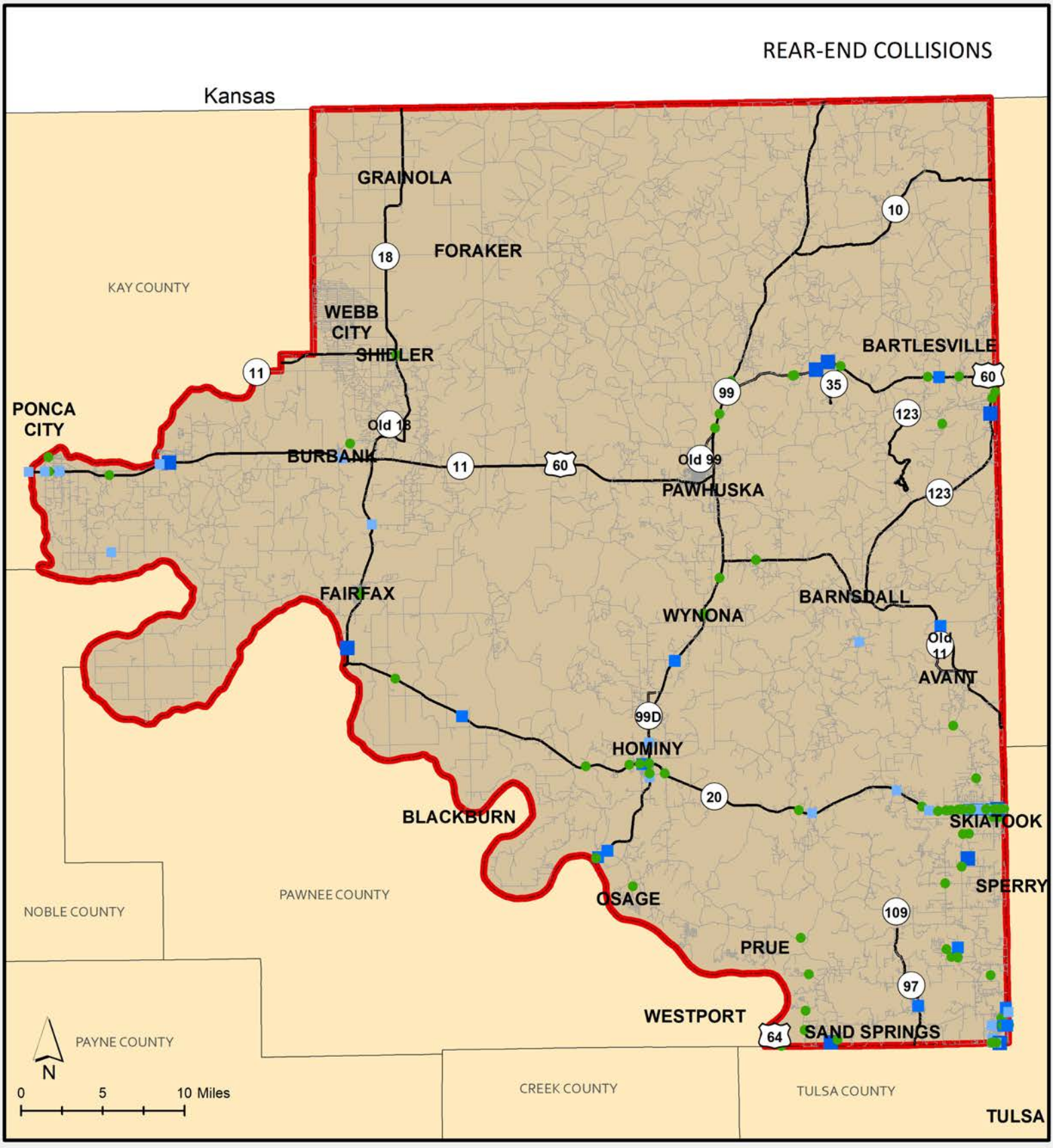
REPORT SECTIONS

Collision Map & Study Totals	(Included)
Collision Analysis Tables	(Included)
- Totals By City, Hwy Class	Checked
- Other Analysis Tables	Checked
Rate Analysis	(Included)
Query Criteria	(Included)

Appendix D

Maps of Collision Types


ANGLE-TURNING COLLISIONS
Kansas
GRAINOLA
FORAKER
KAY COUNTY
WEBB CITY
SHIDLER
PONCA CITY
BURBANK
Old 18
BARTLESVILLE
PAWHUSKA
Old 99
FAIRFAX
WYNONA
BARNSDALL
Old 11
AVANT
99D
HOMINY
BLACKBURN
SKIATOOK
SPERRY
PAWNEE COUNTY
NOBLE COUNTY
OSAGE
PRUE
WESTPORT
SAND SPRINGS
PAYNE COUNTY
CREEK COUNTY
TULSA COUNTY
TULSA
N
0 5 10 Miles
Osage Boundary
Severity (count)*
1 - Property Damage Only (160)
2 - Possible Injury (49)
3 - Non-incapacitating Injury (26)
4 - Incapacitating Injury (8)
5 - Fatality (3)
*count shows only mappable collisions
Osage Nation Collisions (2014-2018)
Source: ODOT SAFE-T



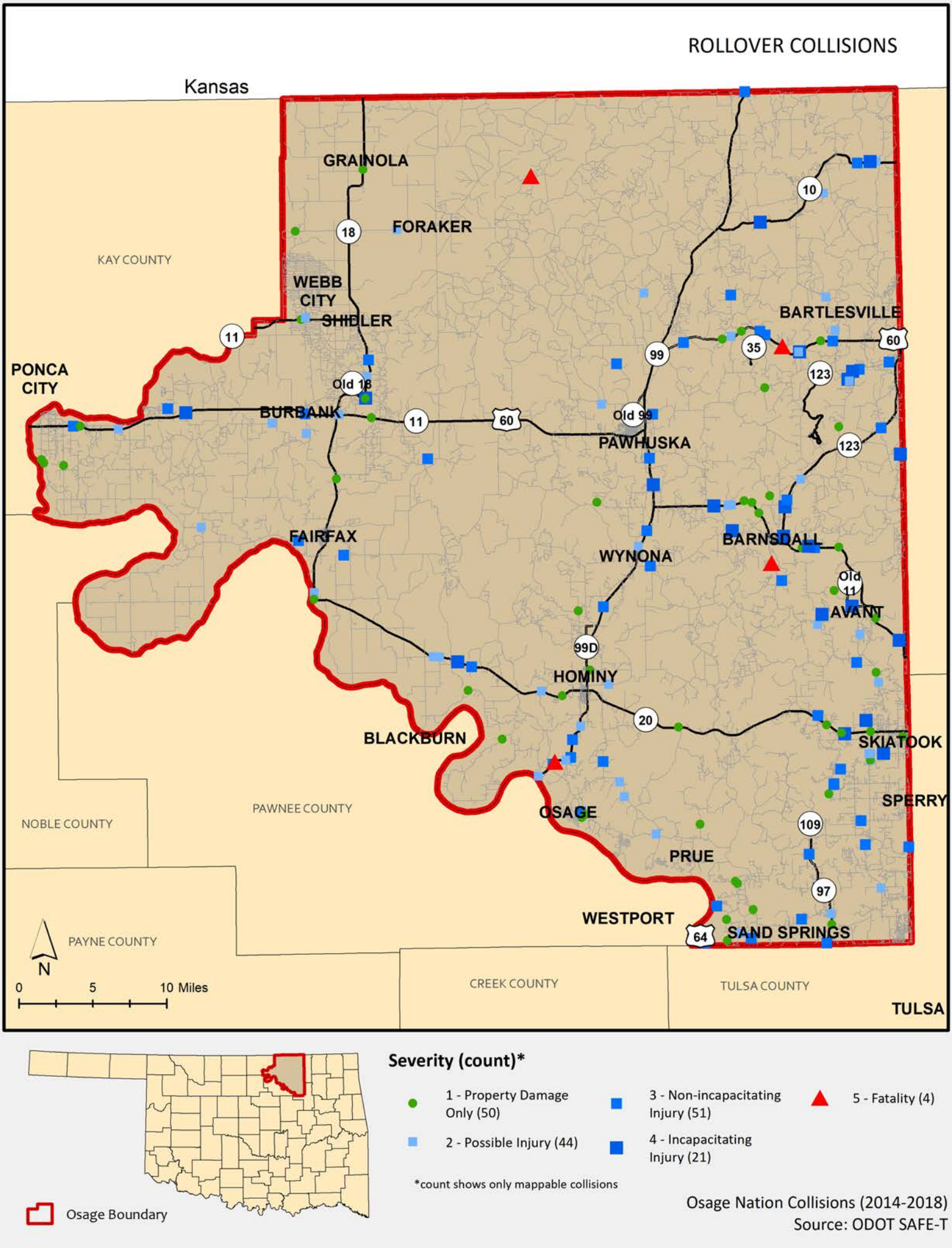
Osage Boundary

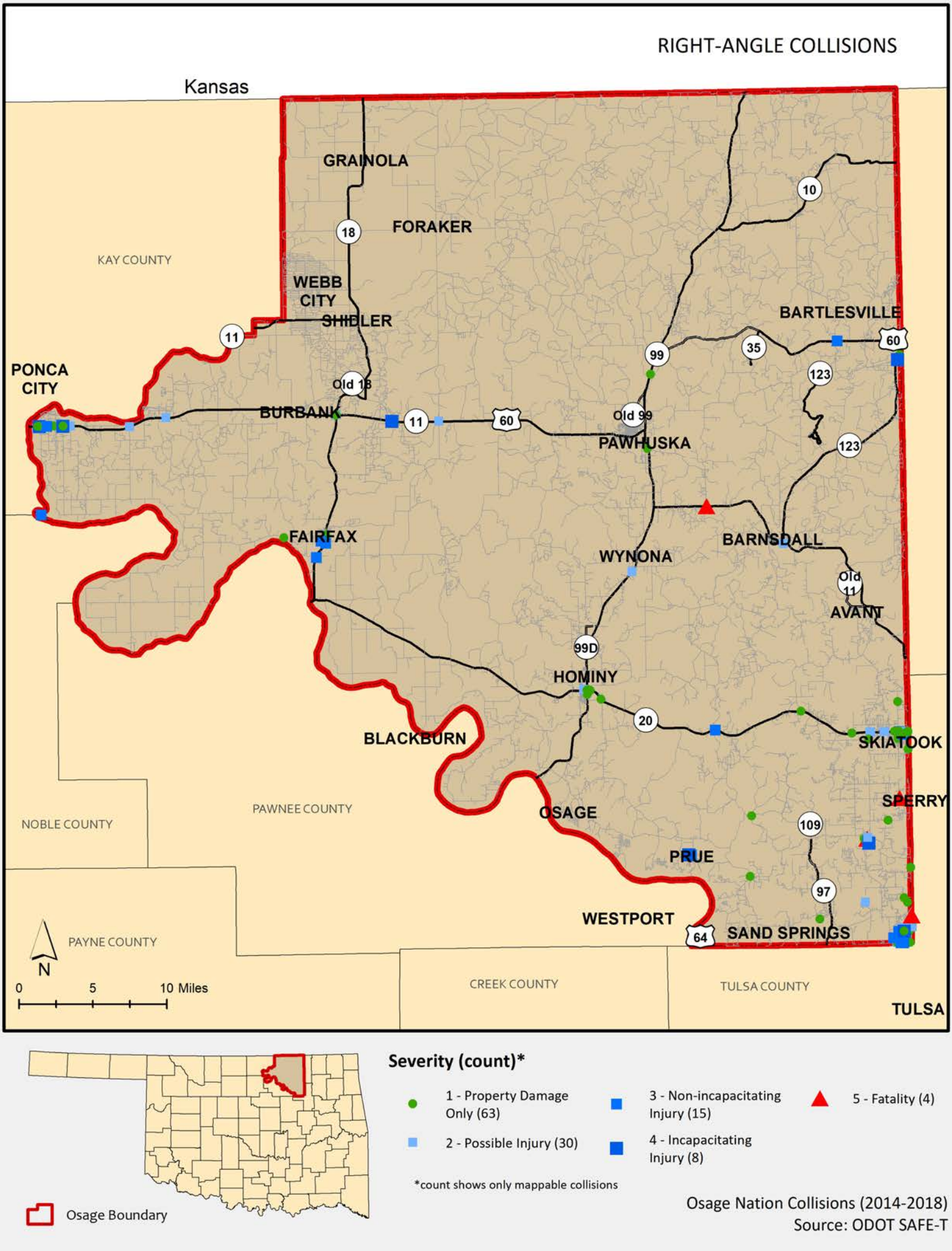
Severity (count)*

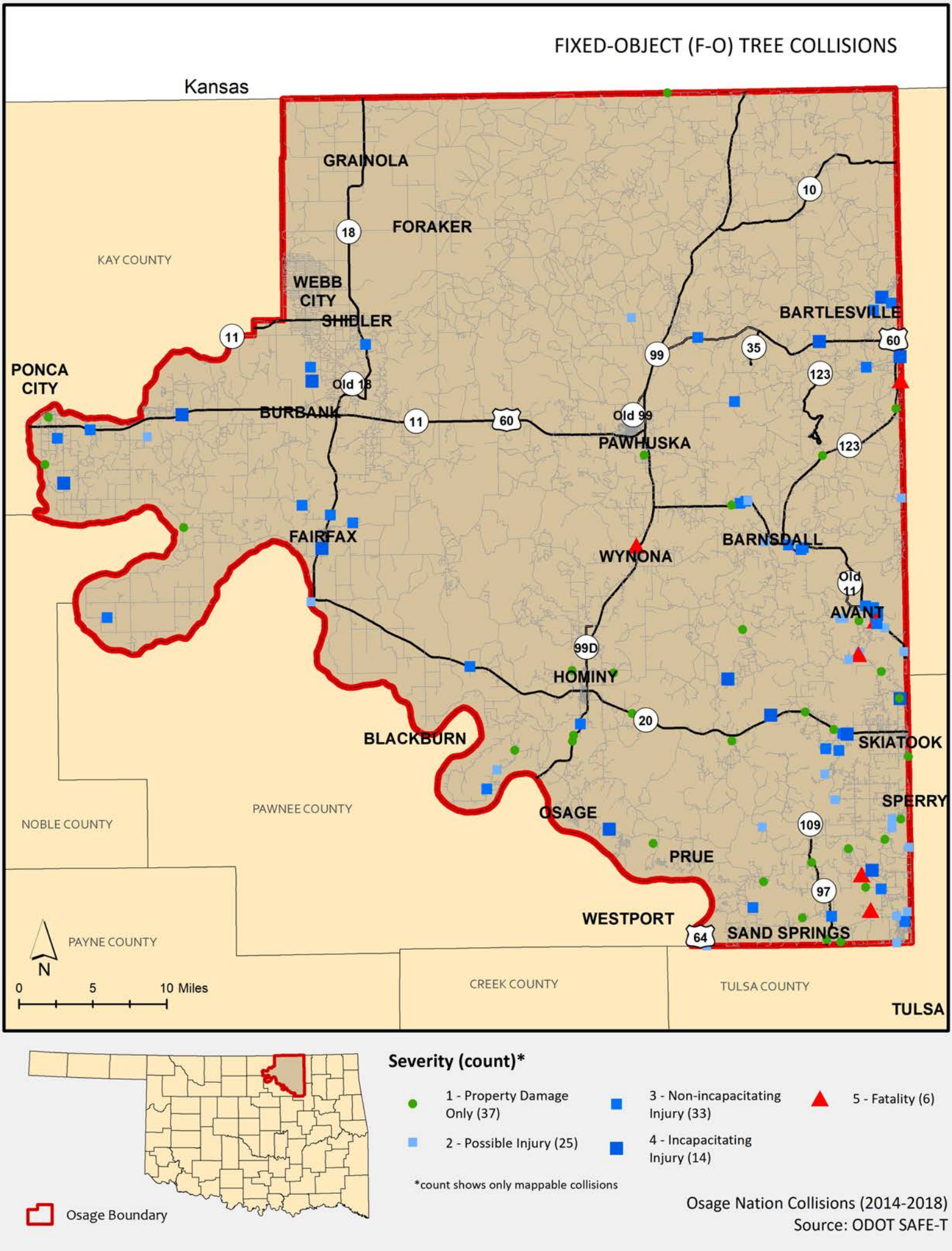
- 1 - Property Damage Only (146)
- 2 - Possible Injury (44)
- 3 - Non-incapacitating Injury (17)
- 4 - Incapacitating Injury (9)
- 5 - Fatality (0)

*count shows only mappable collisions

Osage Nation Collisions (2014-2018)
Source: ODOT SAFE-T


ROLLOVER COLLISIONS
Kansas
GRAINOLA
FORAKER
KAY COUNTY
WEBB CITY
SHIDLER
PONCA CITY
BURBANK
Old 18
BARTLESVILLE
PAWHUSKA
Old 99
FAIRFAX
WYNONA
BARNSDALL
Old 11
AVANT
HOMINY
BLACKBURN
SKIATOOK
SPERRY
OSAGE
PRUE
WESTPORT
SAND SPRINGS
NOBLE COUNTY
PAWNEE COUNTY
PAYNE COUNTY
CREEK COUNTY
TULSA COUNTY
TULSA
N
0 5 10 Miles
Severity (count)*
1 - Property Damage Only (50)
2 - Possible Injury (44)
3 - Non-incapacitating Injury (51)
4 - Incapacitating Injury (21)
5 - Fatality (4)
*count shows only mappable collisions
Osage Boundary
Osage Nation Collisions (2014-2018)
Source: ODOT SAFE-T


RIGHT-ANGLE COLLISIONS
Kansas
GRAINOLA
FORAKER
KAY COUNTY
WEBB CITY
SHIDLER
PONCA CITY
BURBANK
Old 18
BARTLESVILLE
PAWHUSKA
Old 99
FAIRFAX
WYNONA
BARNSDALL
AVANT
Old 11
HOMINY
BLACKBURN
SKIATOOK
SPERRY
OSAGE
PRUE
WESTPORT
SAND SPRINGS
NOBLE COUNTY
PAWNEE COUNTY
PAYNE COUNTY
CREEK COUNTY
TULSA COUNTY
TULSA
N
0 5 10 Miles
Osage Boundary
Severity (count)*
1 - Property Damage Only (63)
2 - Possible Injury (30)
3 - Non-incapacitating Injury (15)
4 - Incapacitating Injury (8)
5 - Fatality (4)
*count shows only mappable collisions
Osage Nation Collisions (2014-2018)
Source: ODOT SAFE-T


FIXED-OBJECT (F-O) TREE COLLISIONS
Kansas
KAY COUNTY
GRAINOLA
FORAKER
WEBB CITY
SHIDLER
PONCA CITY
BURBANK
FAIRFAX
PAWHUSKA
BARTLESVILLE
WYNONA
BARNSDALL
AVANT
HOMINY
BLACKBURN
SKIATOOK
SPERRY
OSAGE
PRUE
WESTPORT
SAND SPRINGS
TULSA
NOBLE COUNTY
PAWNEE COUNTY
PAYNE COUNTY
CREEK COUNTY
TULSA COUNTY
Old 18
Old 99
Old 11
99D
0 5 10 Miles
N
Severity (count)*
1 - Property Damage Only (37)
2 - Possible Injury (25)
3 - Non-incapacitating Injury (33)
4 - Incapacitating Injury (14)
5 - Fatality (6)
*count shows only mappable collisions
Osage Boundary
Osage Nation Collisions (2014-2018)
Source: ODOT SAFE-T