

Truck Tractor Crash Analysis Tribal Lands in Arizona 2009-2013



ITCA Tribal Epidemiology Center (TEC)

August 6, 2015

Topics

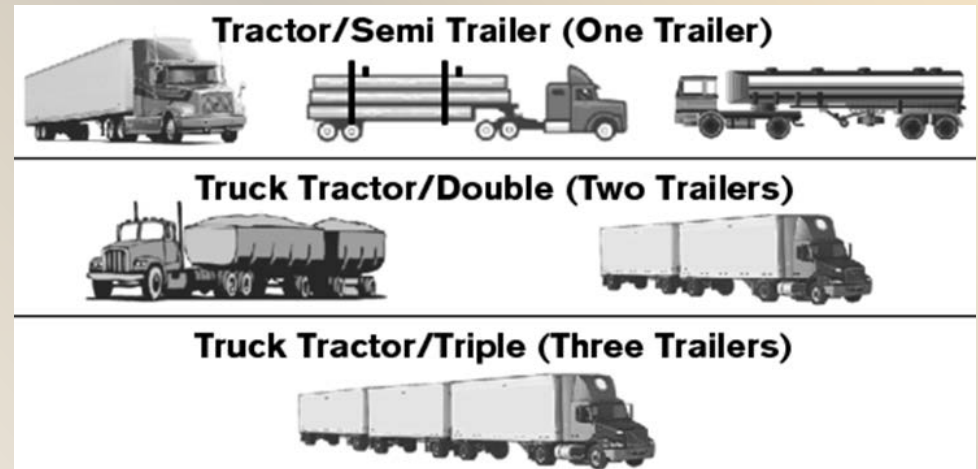
- Background
- Objectives
- Method
- Findings
- Strengths and limitations
- Recommendations



Source: azcentral.com

Definition: Truck Tractor

- Non-cargo carrying power unit in combination with a semi-trailer.
- Truck tractors and semi-trailer combinations, referred to as tractor/trailers.



Source: U.S. Department of Transportation, Federal Motor Carrier Safety Administration

Why Care about Truck Traffic Safety?

- Arizona is in the middle of a large, expanding trade triangle connecting Southern California, Texas and northern Mexico.
- Annually, commercial trucks make about 8 million trips into and out of Arizona with most on east-west interstate routes.
- North-south trade with Mexico and Canada is a major initiative nationally and for Arizona.
- By 2050, freight shipments are expected to triple in Arizona.



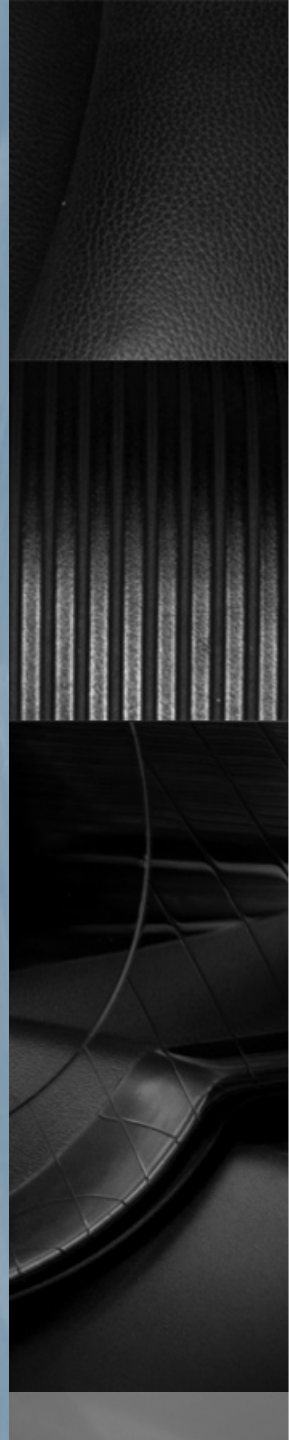
Source: Santa Cruz Commerce Center



2010 Statewide Crash Analysis

- Utilized 1997-2006 reported crash data in the Arizona Location Identification Surveillance System
- Completed an analysis of n=27,382 crashes on tribal lands in Arizona
- Injury and fatal crash rates were about 5 times higher on tribal lands than statewide for:
 - Lane departure crashes involving truck tractors trailers (TTT)
 - Speed-related crashes involving TTT

2009-2013 Analysis of TTT Crashes on Tribal Lands in Arizona



Objectives

- Compare the number and percent of injuries and fatalities in TTT crashes on and off Tribal lands
- Identify high crash locations
- Identify differences between TTT crashes occurring on and off Tribal lands



Source: overdrive.com

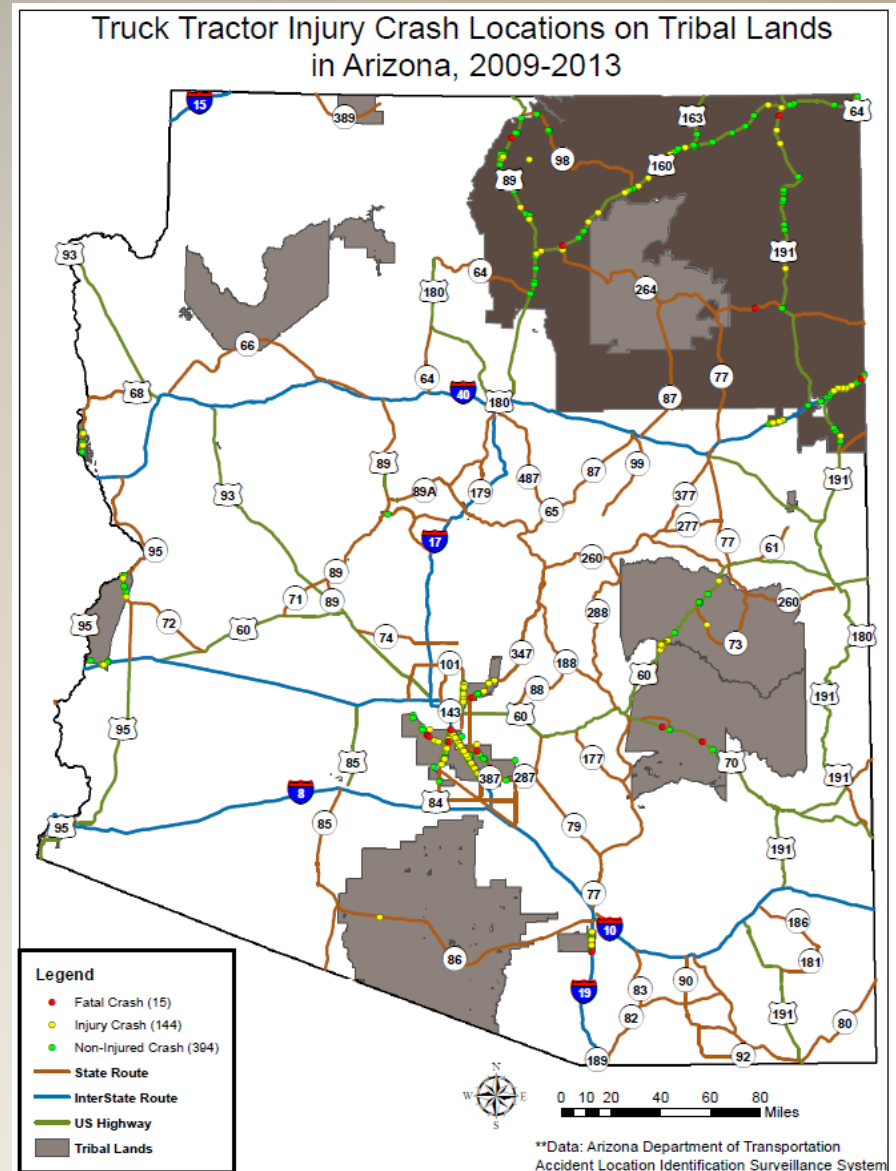


Method and Results

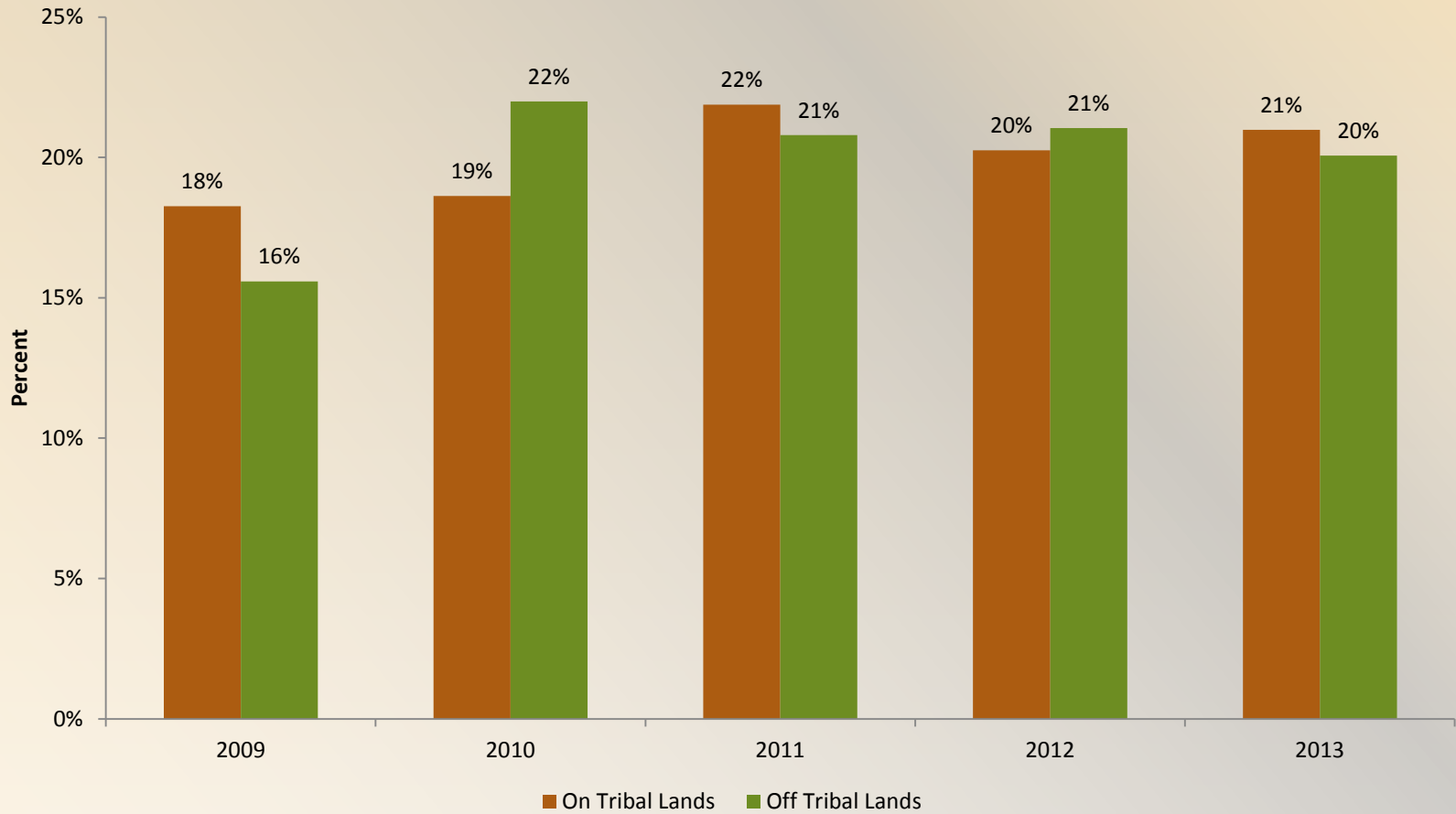
- Utilized 2009-2013 reported crash data in the Arizona Location Identification Surveillance System
- Examined 12,557 total crashes on Tribal lands
 - Identified n=553 total TTT crashes on Tribal lands
 - 4% of crashes on Tribal lands involved TTT
 - 2% of crashes off Tribal lands involved TTT

Results: Location

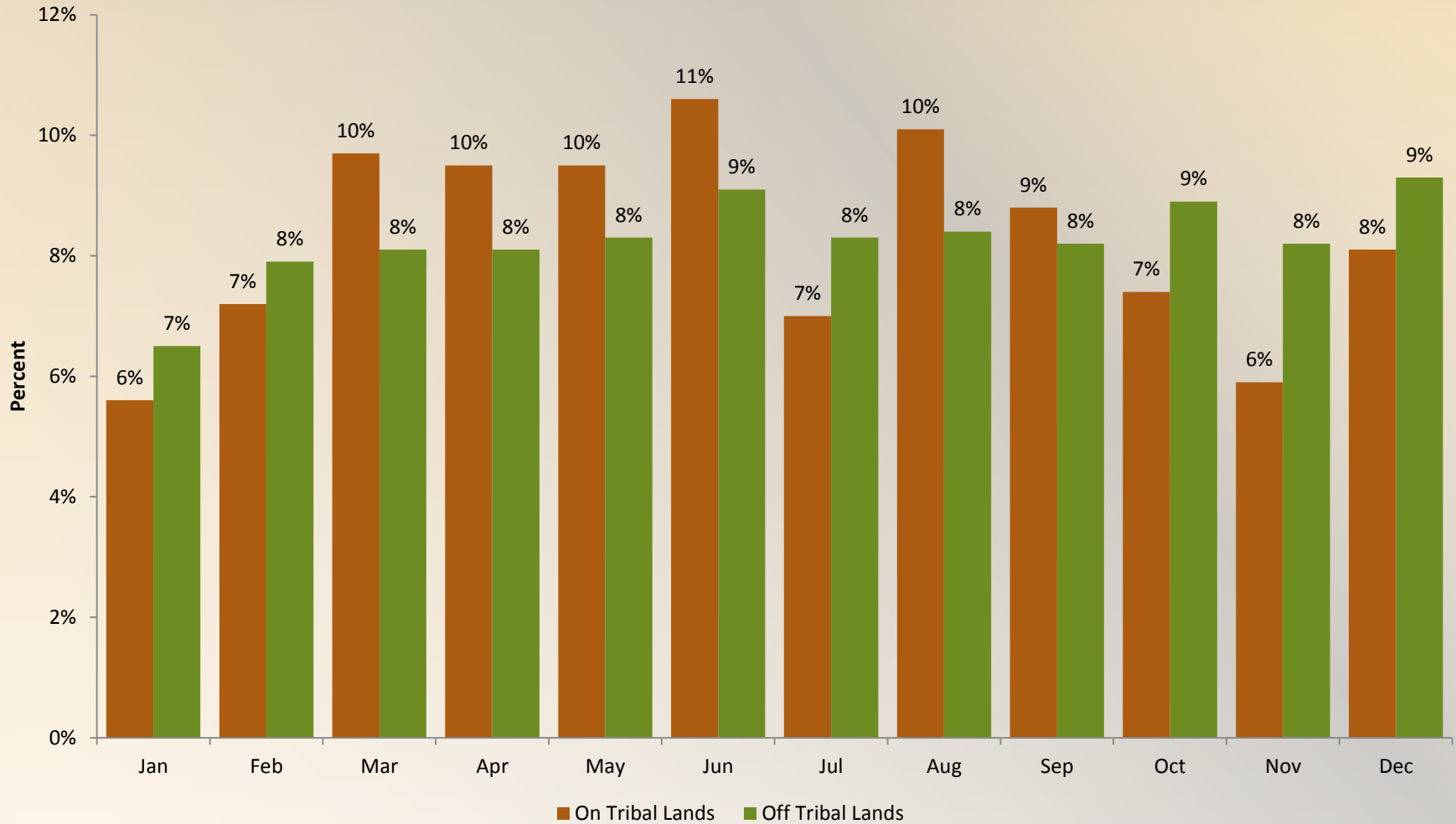
- 94% of truck tractor crashes on Tribal lands occurred on interstates, US highways, and state routes
- 40% of truck tractor crashes occurred on I-10
- 12% of truck tractor crashes occurred on I-40



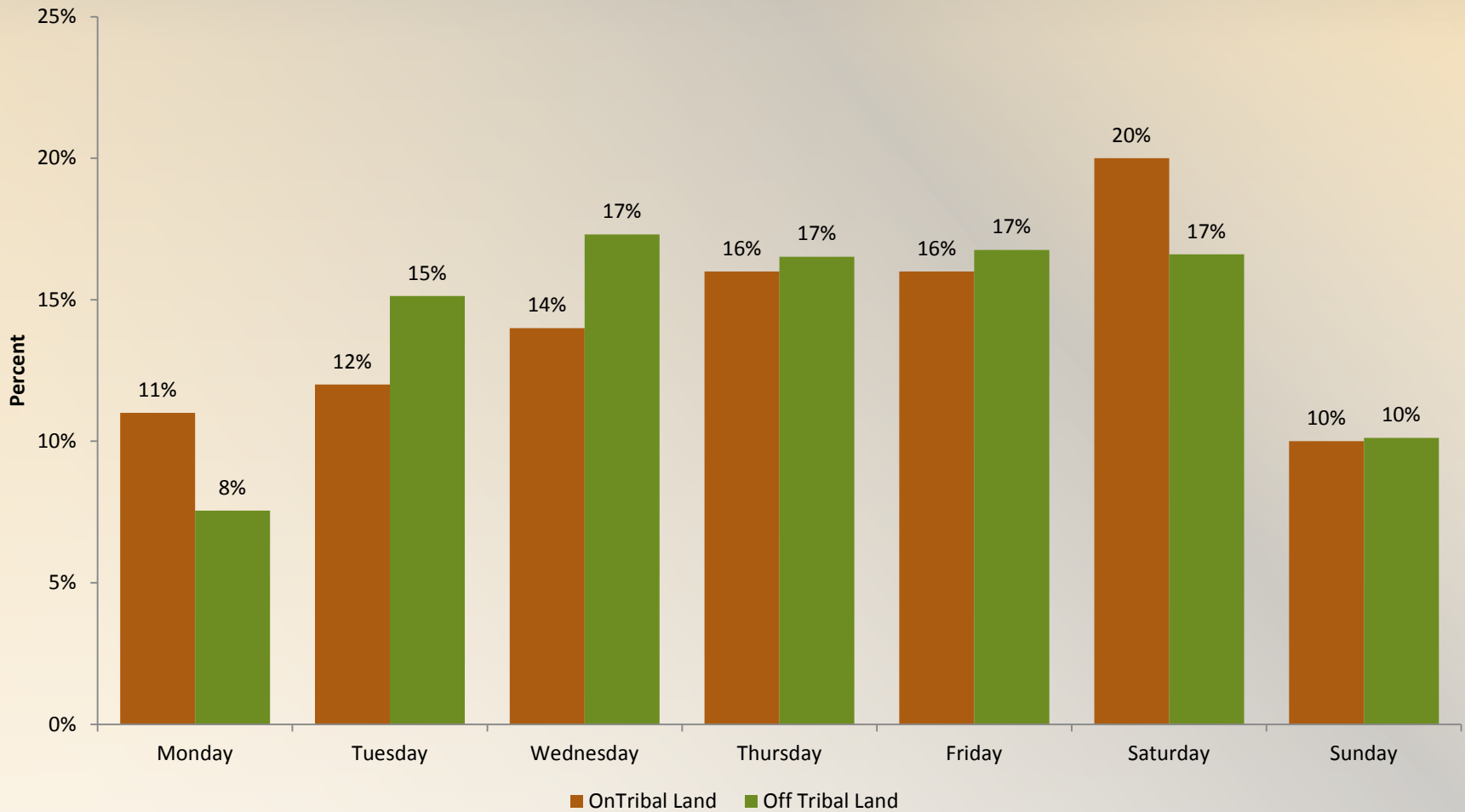
Results: Year



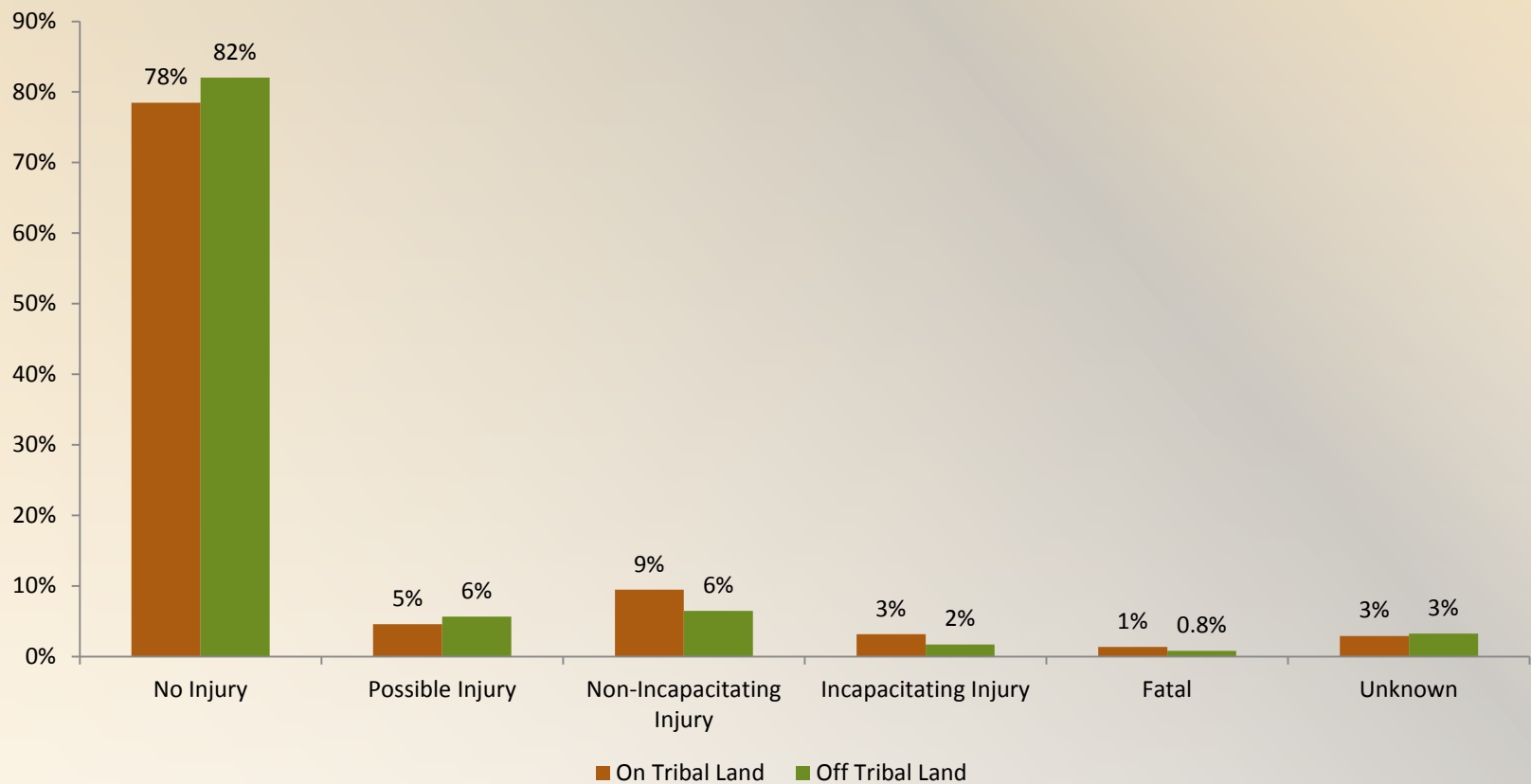
Results: Month



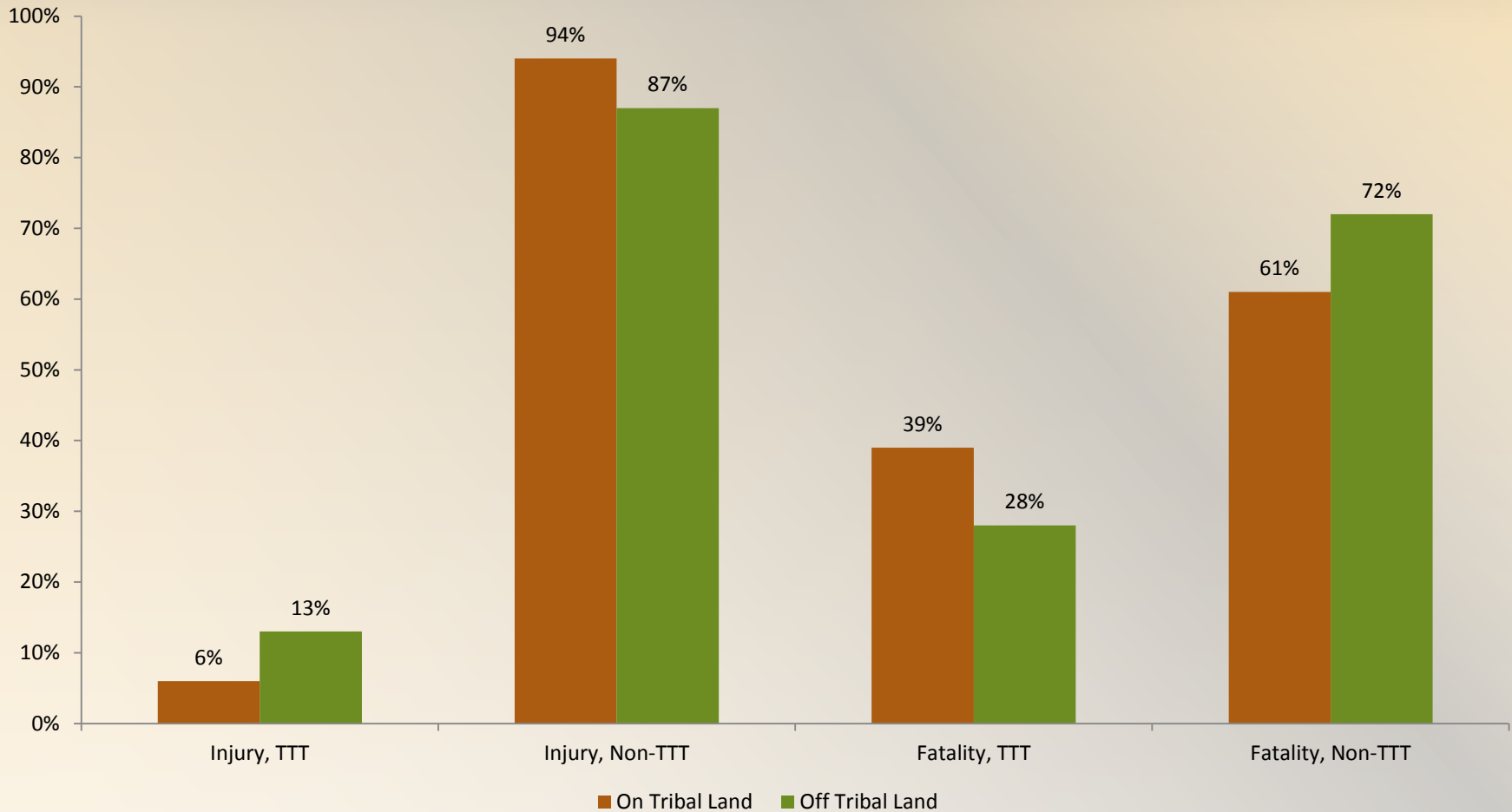
Results: Day of Week



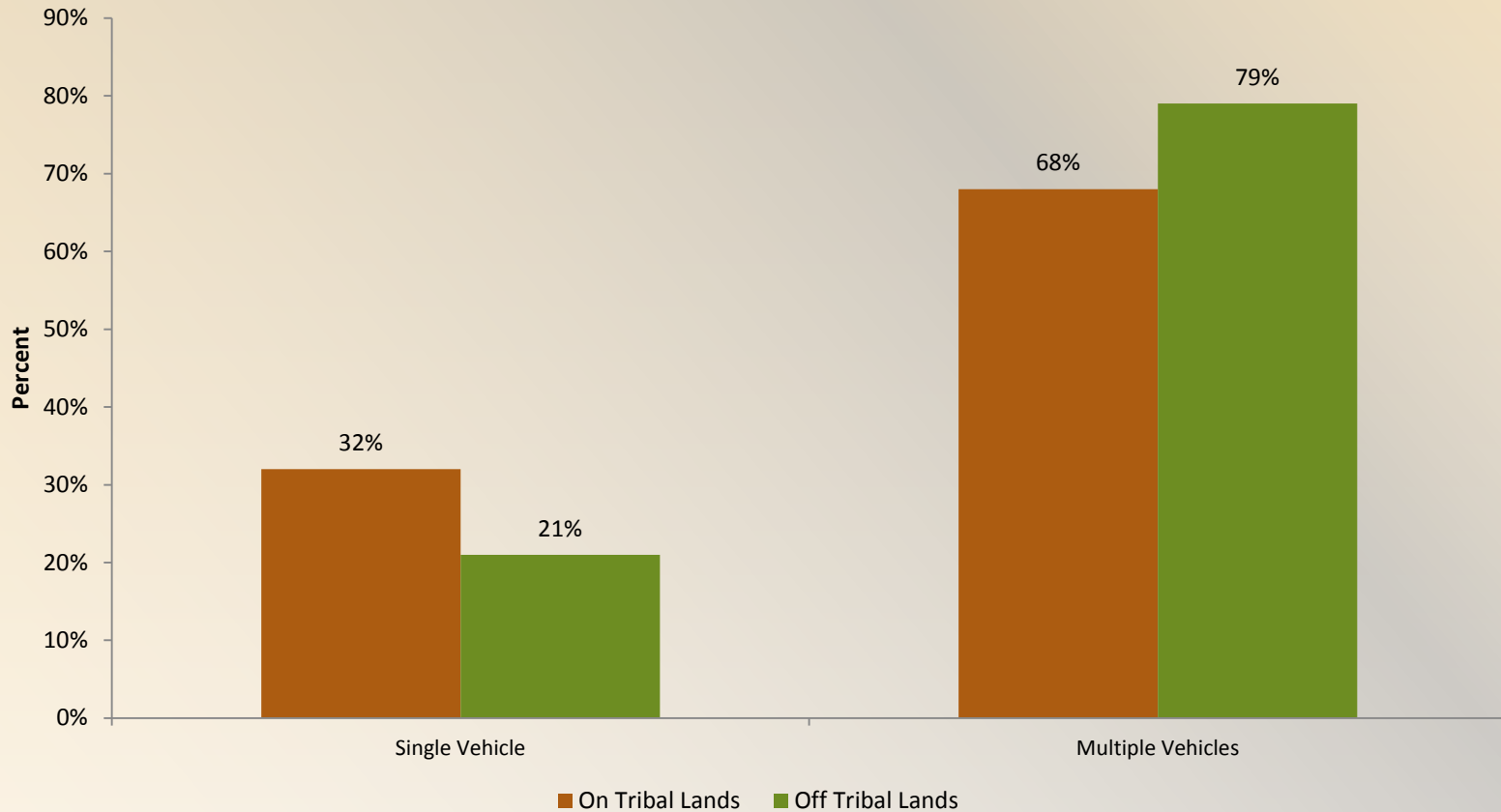
Results: Injury Status



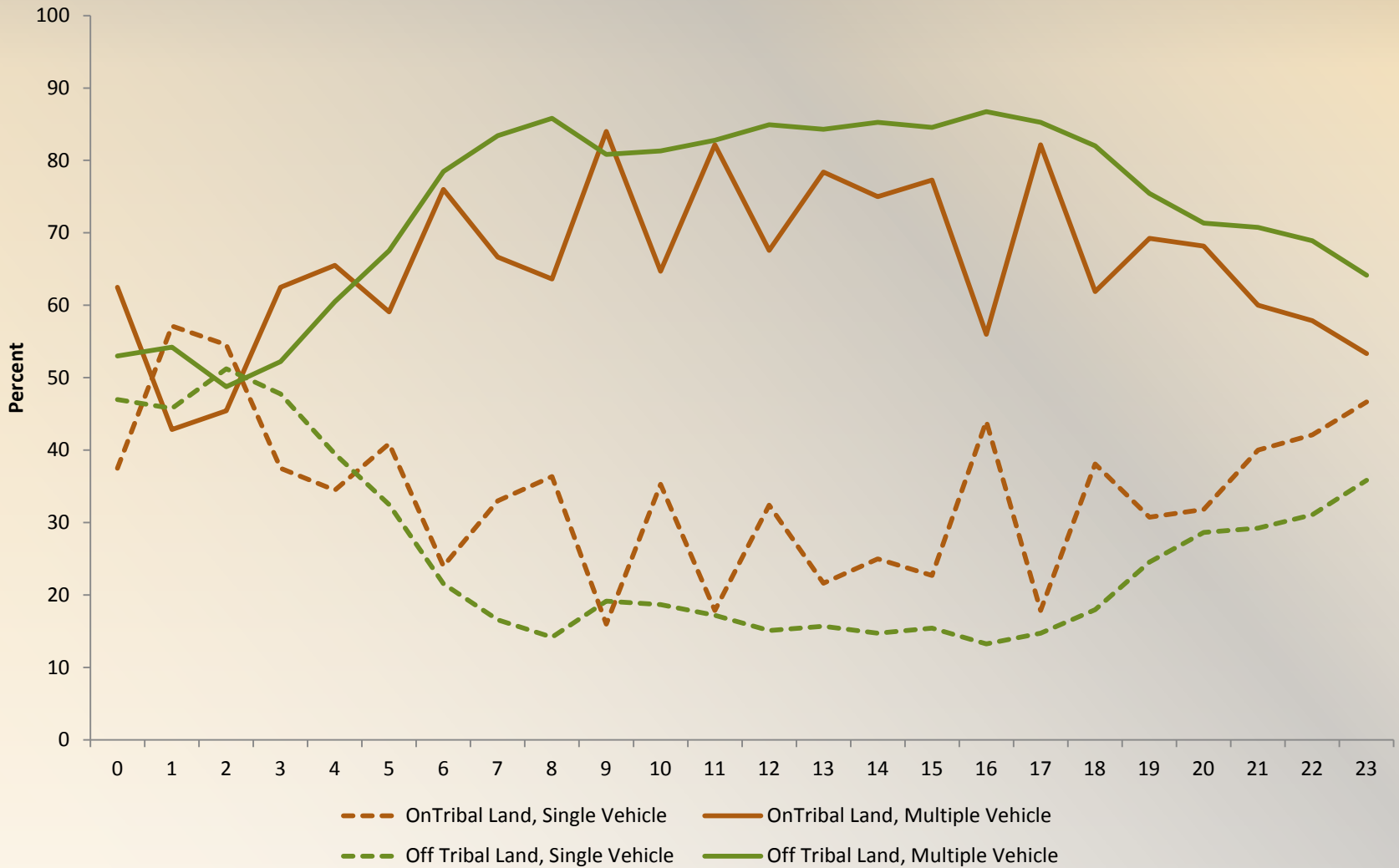
Results: Injuries and Fatalities by Vehicle Type



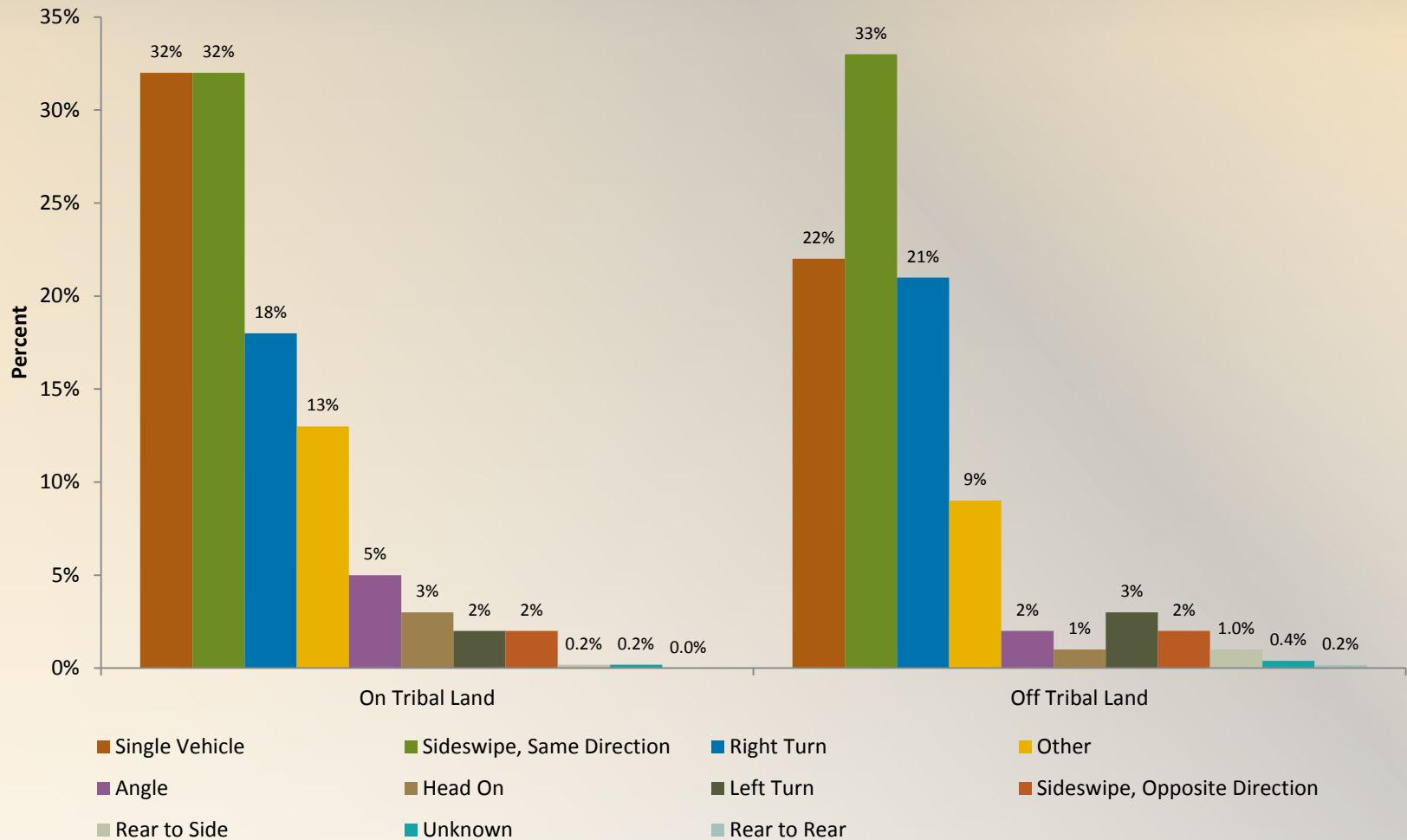
Results: Vehicles per Crash



Results: Time of Day



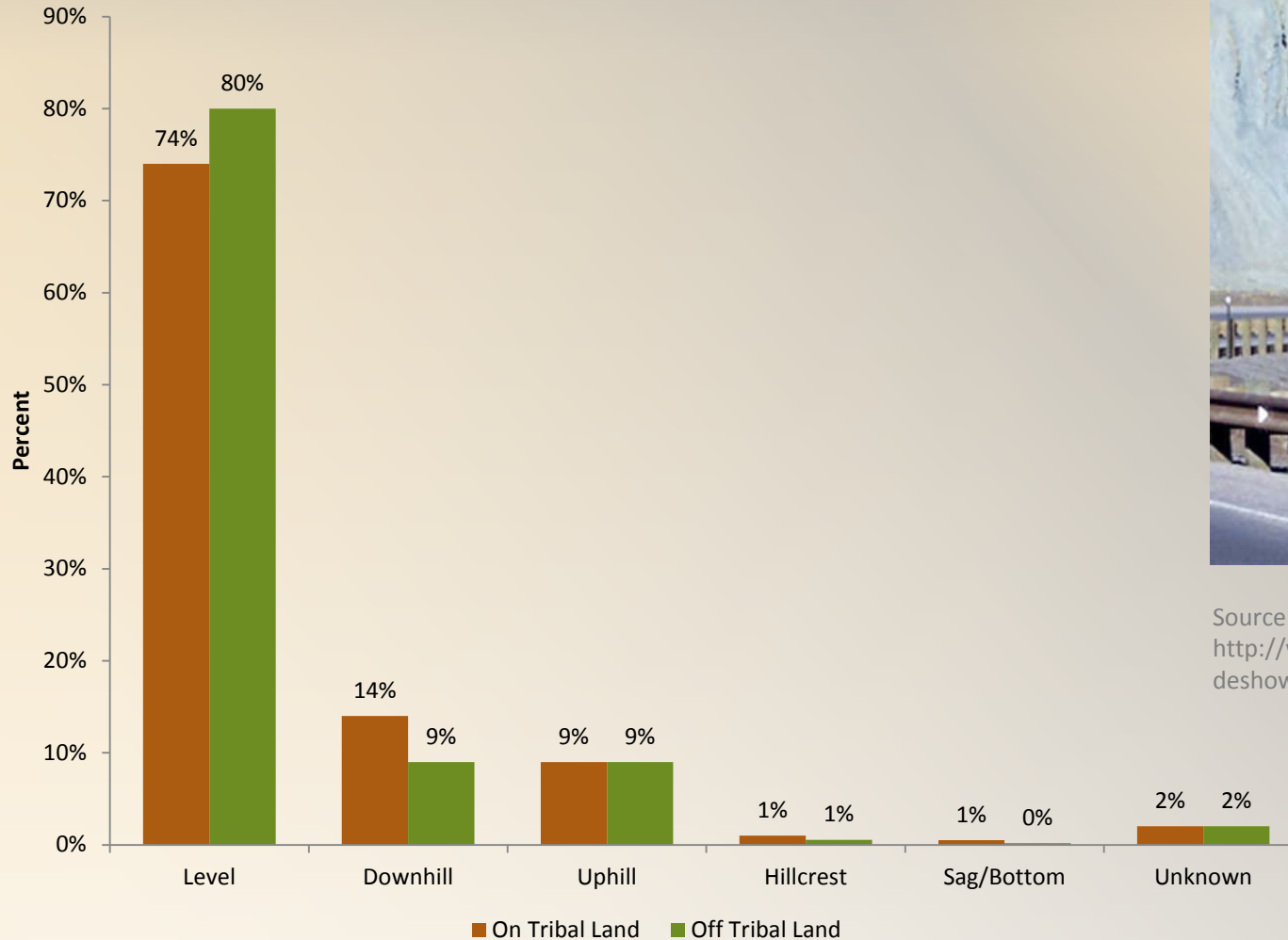
Results: Collision Manner



Results: Most Harmful Event

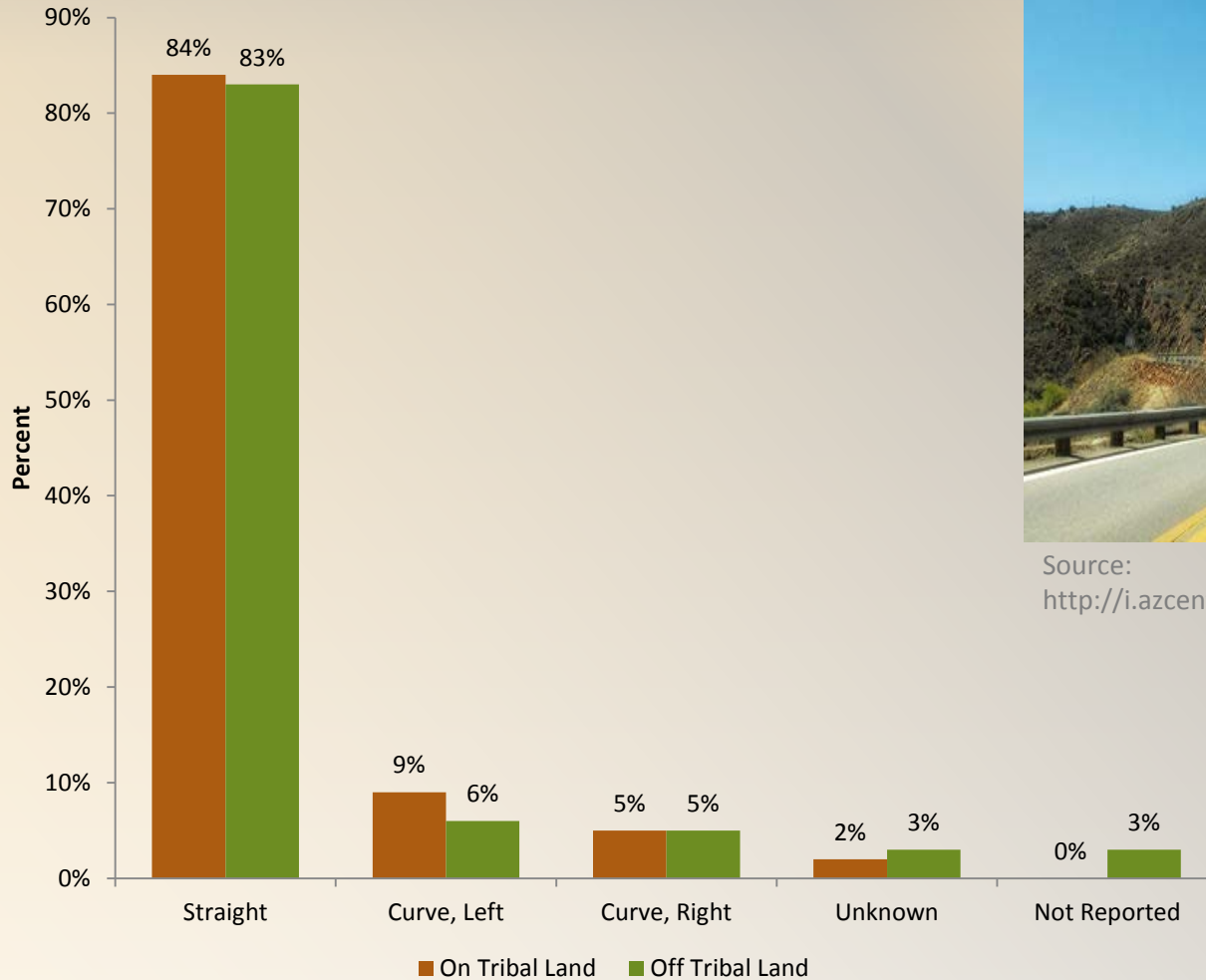
MOST HARMFUL EVENT	On Tribal Lands				Off Tribal Lands			
	TTT		Non-TTT		TTT		Non-TTT	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank
Motor Vehicle in Transport	110	1	97	1	2704	1	2577	1
Overturn/Rollover	17	2	4	3	176	2	48	4
Other, Non-Fixed Object	8	3	5	2	123	3	108	2
Fire/Explosion	8	3	--	--	109	4	--	--
Animal, Livestock	8	3	--	--	--	--	--	--
Struck by Falling/Shifting Cargo	--	--	4	3	--	--	39	5
Other, Non-Collision	6	4	3	4	--	--	--	--
Cargo Loss/Shift	--	--	2	5	--	--	--	--
Tree/Bush, Standing	--	--	2	5	--	--	--	--
Parked Motor Vehicle	--	--	--	--	--	--	71	3
Animal, Wild Game	--	--	--	--	92	5	--	--

Results: Road Grade



Source:
http://www.mountaindirectory.com/md_sli_deshow/md_008.jpg

Results: Road Alignment



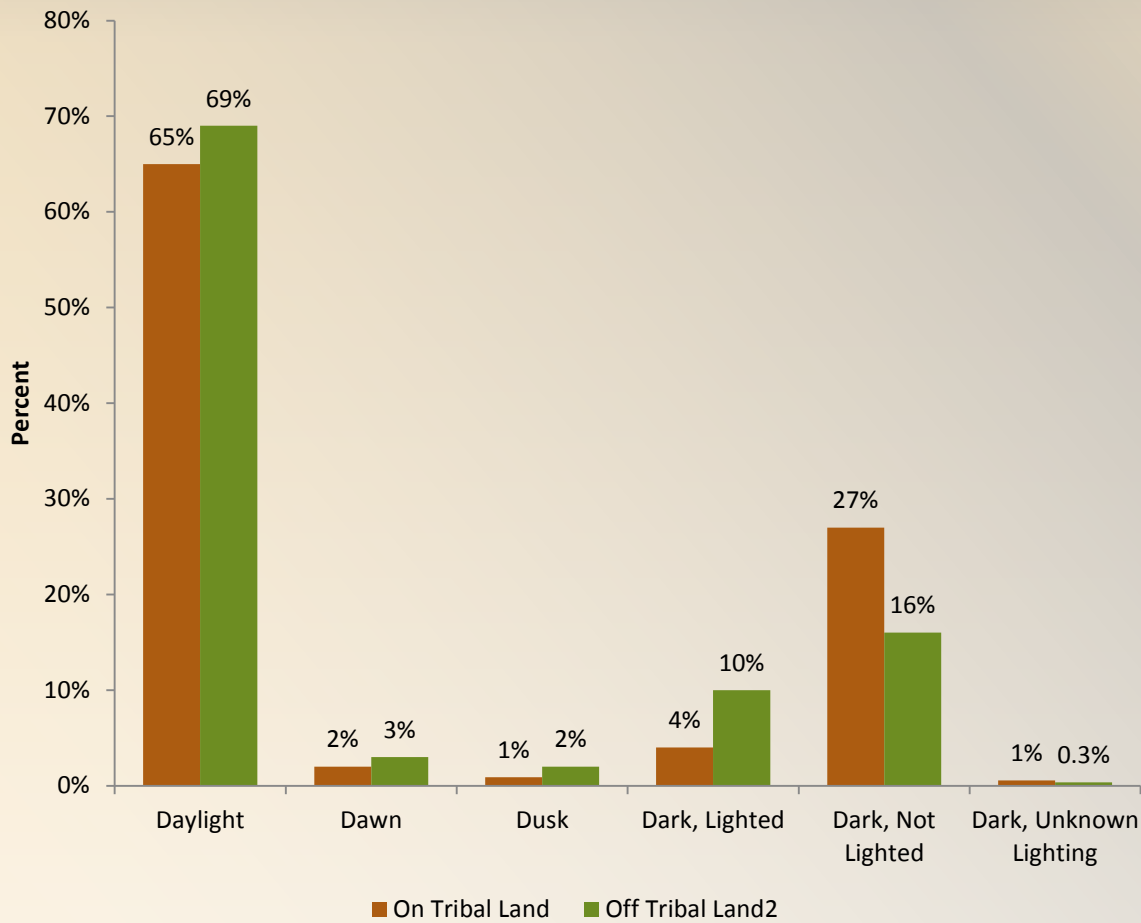
Source:

<http://i.azcentral.com/commphotos/view/686936.jpg>

Results: Action at Time of Crash

ACTION AT TIME OF CRASH	On Tribal Lands				Off Tribal Lands			
	TTT		Non-TTT		TTT		Non-TTT	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank
Going Straight Ahead	378	1	222	1	6731	1	4913	1
Negotiating a Curve	33	2	6	10	222	10	--	--
Making a Left Turn	29	3	24	4	802	4	502	5
Slowing in Trafficway	26	4	26	3	620	5	515	4
Changing Lanes	24	5	19	5	946	2	671	3
Avoiding Vehicle/Object	20	6	13	7	226	9	174	9
Unknown	18	7	11	8	313	7	307	7
Stopped in Trafficway	17	8	44	2	595	6	1185	2
Making Right Turn	15	9	6	10	924	3	408	6
Overtaking/Passing	12	10	16	6	--	--	279	8
Other	--	--	8	9	--	--	--	--
Backing	--	--	--	--	303	8	--	--
Properly Parked	--	--	--	--	--	--	144	10

Results: Low light conditions

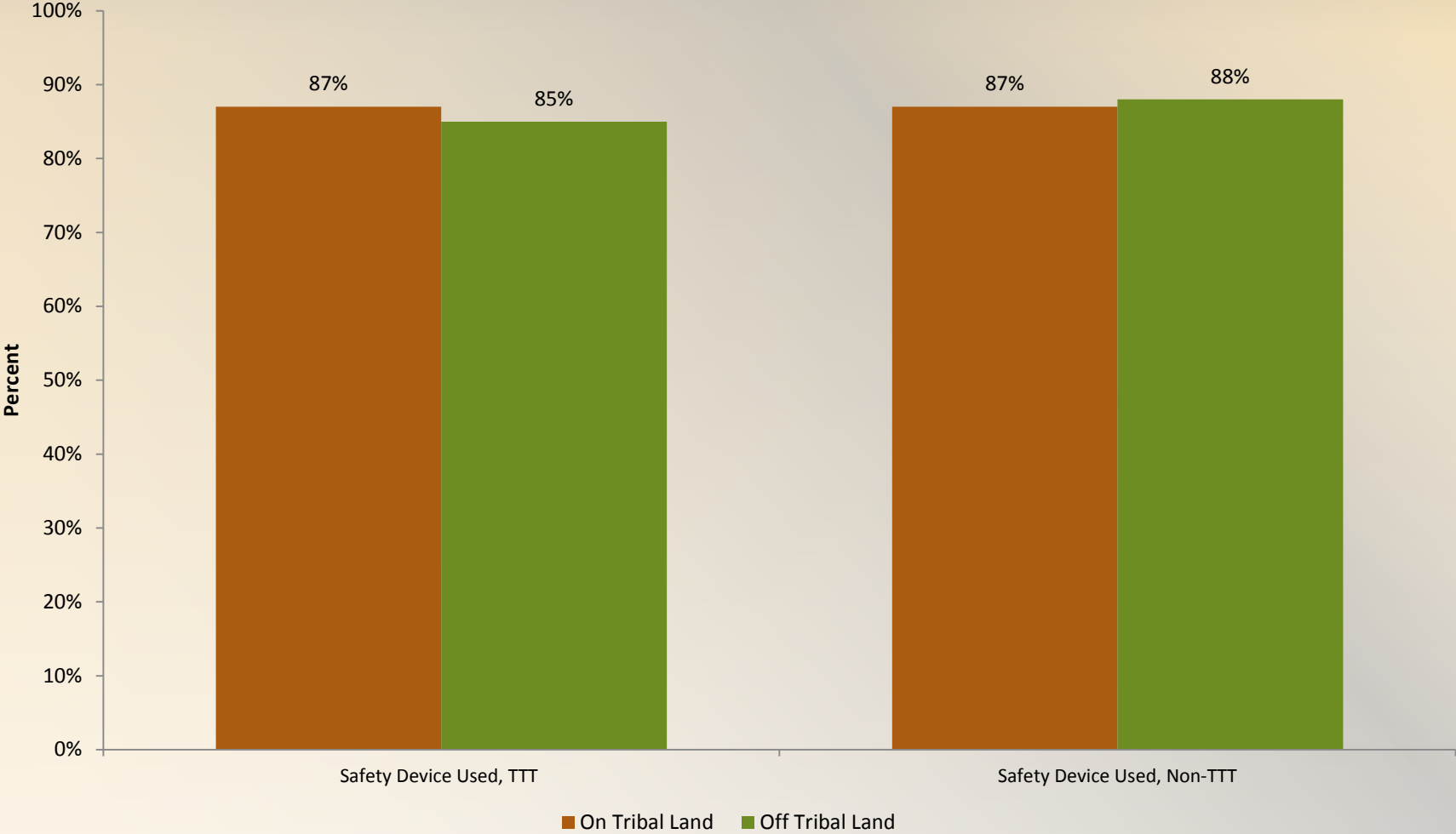


Source: www.mybinc.com/blog/category/motor-vehicle-record-check

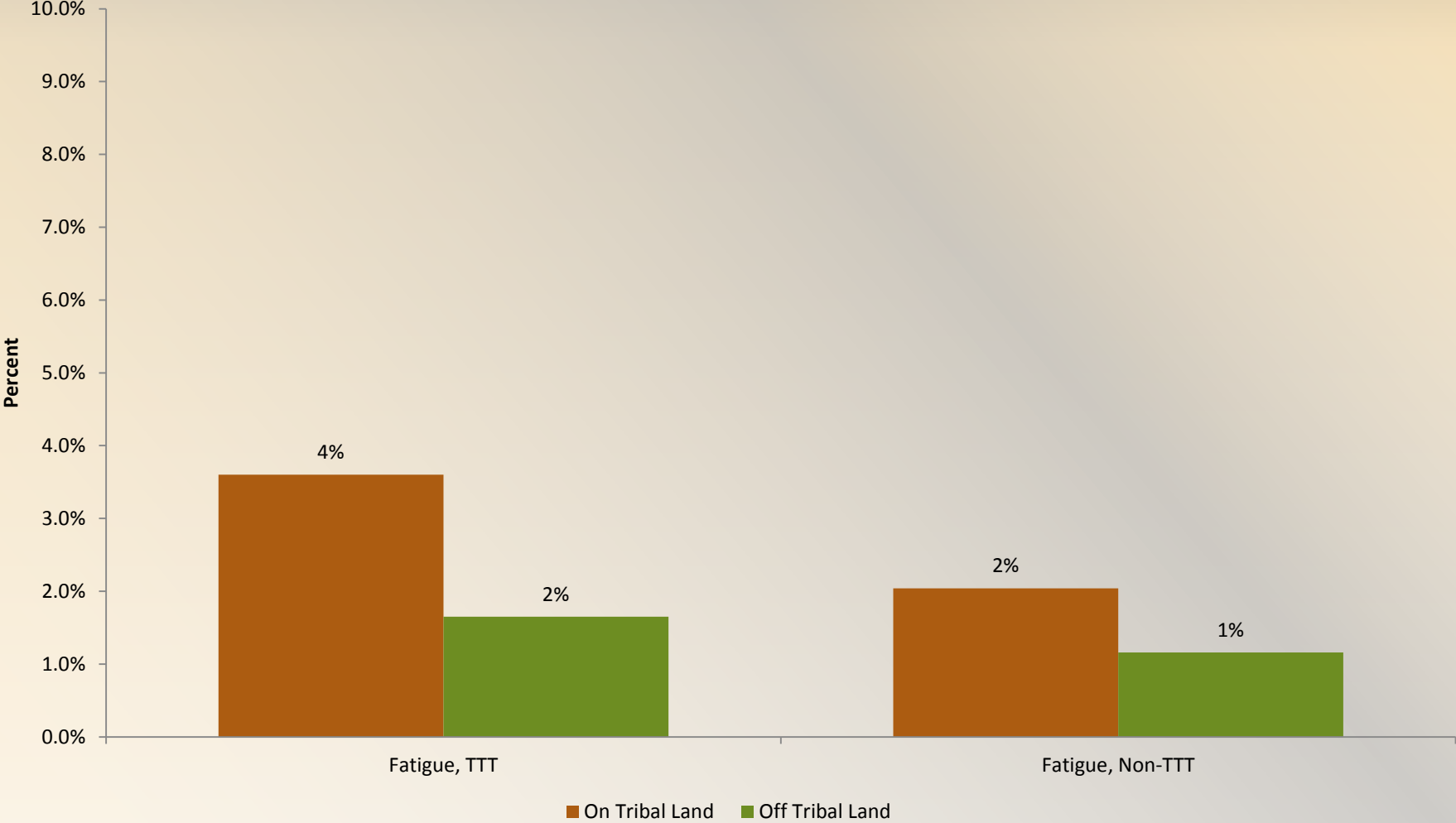


Source: www.corporatedriving.com/semi-truck-driving-safety/

Results: Safety Device Use



Results: Driving While Fatigued



Results: Violation

VIOLATION	On Tribal Lands				Off Tribal Lands			
	TTT		Non-TTT		TTT		Non-TTT	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank
Speed Too Fast For Conditions	94	1	50	1	1261	1	9400	1
Inattention/ Distraction	50	2	25	2	1222	2	771	3
Unknown	29	3	23	3	940	3	774	2
Other	31	4	19	4	685	5	385	5
Failed to Keep in Proper Lane	22	5	16	5	403	6	280	7
Unsafe Lane Change	18	6	14	6	757	4	483	4
Failed to Yield Right of Way	--	--	12	7	210	8	327	6
Improper Turn	11	7	6	10	361	7	134	9
Drove in Opposing Traffic Lane	--	--	10	8	--	--	--	--
Followed Too Closely	8	8	9	9	140	9	--	--
Other Unsafe Passing	4	9	--	--	--	--	129	10
Disregarded Traffic Signal	--	--	6	10	68	10	141	6

Strengths and Limitations

Strengths

- 5 years of crash data
- Crash locations are accurate
- Crash data is complete

Limitations

- Many fields had data not reported
- May include tribal and non-tribal drivers



Source: Federal Highway Administration, FHWA-RD-01-159



Recommendations

- **Policy:** Strengthen tribal traffic codes pertaining to commercial traffic on tribal lands
- Participate in the heavy vehicle task force for the Arizona Strategic Highway Safety Plan implementation
- **Enforcement:** Train tribal police to become certified commercial vehicle inspectors
- **Education:** Conduct “Share the Road” training for tribal members to heighten awareness of driving near commercial vehicles
- **Engineering:** Utilize strategies on state routes through tribal communities

Traffic Calming in Tribal Communities

State routes through tribal communities may be “main streets”.

- Speed feedback signs caution drivers to lower speed
- Community gateway signs notify drivers they are entering a tribal community



Source: www.sportbikeworld.com



Photo by: J. Schallan



Source: wikipedia user - Terfili



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Crash map developed by Jonathan Davis, ITCA ArcGIS Fellow