TRAFFIC SAFETY FACTS
Research Note

NHTSA

Methodology on Identifying Fatal Motor Vehicle Traffic Crashes That Occurred on Native American Reservations In the United States

Summary

This research note presents a new methodology to identify motor vehicle crashes on Native American reservations by using the Fatality Analysis Reporting System (FARS) special jurisdiction element and the derived Bureau of Indian Affairs (BIA) element from the geospatial software. In 2016 there were 380 motor vehicle fatalities that occurred on Native American reservations based on this new methodology, as compared to 298 fatalities reported in FARS and 321 fatalities identified from BIA.

Introduction

From 1975 to 2000 fatal motor vehicle traffic crashes that occurred on Native American reservations were identified using only the FARS special jurisdiction element. Since 2001, FARS has collected latitude and longitude elements[1] that are then imported into the geospatial software and overlaid on the BIA land layer to identify crashes on Native American reservations. Both the FARS special jurisdiction coding and the derived BIA elements using the geospatial software are not completely accurate. In order to produce a more complete fatality count on the reservations, a new methodology is proposed for identifying fatal motor vehicle crashes that occurred on Native American reservations by using the special jurisdiction coding (SP_JUR=3) and the BIA land coding (BIA=1).

FARS Data

FARS is a census of fatal motor vehicle traffic crashes in the 50 States, the District of Columbia, and Puerto Rico. To be included in FARS, a crash must involve a motor vehicle traveling on a roadway and must result in the death of at least one person (a vehicle occupant—driver or passenger—or a nonoccupant—pedestrian, bicyclist, or other) within 30 days of the crash.

FARS Special Jurisdiction Coding of Crashes That Occurred on Native American Reservations

Since 1975 FARS has collected data on fatal motor vehicle traffic crashes in the United States and reports if the fatal crash occurred in a special jurisdiction as defined below.

Definition: This data element identifies if the location on the trafficway where the crash occurred qualifies as a Special Jurisdiction even though it may be patrolled by State, county, or local police (e.g., all State highways running through Native American reservations are under the jurisdiction of the reservation).

Attribute Codes for Special Jurisdiction (SP_JUR in FARS):

0 – No Special Jurisdiction (includes National Forests since 2008)

1 – National Park Service

2 – Military

3 – Native American Reservation

4 – College/University Campus

5 – Other Federal Properties (since 1977)

6 – Other (since 1976)

9 – Unknown

If a fatal motor vehicle traffic crash is coded as SP_JUR=3, then it occurred on a Native American reservation. Relevant information on the police crash report, or a FARS coder with the local knowledge that the crash location was within a Native American reservation, is needed in order to code the crash as SP_JUR=3.

---

[1] FARS collected them in 1999 and 2000 but they were mostly unknowns, so we focused on 2001 and on.

Geospatial Analysis Using FARS Latitude and Longitude Elements

FARS also contains the latitude and longitude data elements starting in 2001.[2] These elements are coded by the FARS analysts based on the location information available on the police crash report (either directly from a listed latitude/longitude coordinates or indirectly via the address of the crash [road name, mile marker, etc.]). Not all FARS crashes have valid latitude/longitude coordinates; these crashes are coded as unknowns.

Using the geospatial software, FARS fatal crash locations were imported and overlaid on a BIA land layer. Refer to the Appendix section to get more information about this BIA land layer. FARS crashes are then coded as being within the boundaries of BIA land (BIA=1) or not (BIA=0). When analyzing the FARS data using the geospatial software, there are inconsistencies between the FARS special jurisdiction coding and the derived BIA element using geospatial software coding. Table 1 summarizes the inconsistencies using the FARS 2001–2015 Final Files and 2016 Annual Report File.

Table 1

Cross Tabulation of Fatal Motor Vehicle Crashes on Native American Reservations by FARS Special Jurisdiction Coding And Derived BIA Element Using Geospatial Software, 2001–2016

Year by Derived BIA Element Using Geospatial Software		Special Jurisdiction (FARS)				Total
		No Special Jurisdiction	Indian Reservation	All Other Special Jurisdictions	Unknown	
2001	On BIA Land	82	84	1	0	167
	Not on BIA Land	30,615	28	79	10	30,732
	Unknown Latitude/Longitude	6,817	114	30	2	6,963
	Total	37,514	226	110	12	37,862
2002	On BIA Land	123	130	1	0	254
	Not on BIA Land	35,084	44	71	2	35,201
	Unknown Latitude/Longitude	2,892	114	22	8	3,036
	Total	38,099	288	94	10	38,491
2003	On BIA Land	112	124	1	0	237
	Not on BIA Land	35,367	42	60	4	35,473
	Unknown Latitude/Longitude	2,631	106	25	5	2,767
	Total	38,110	272	86	9	38,477
2004	On BIA Land	111	177	0	1	289
	Not on BIA Land	36,162	38	78	2	36,280
	Unknown Latitude/Longitude	1,802	49	21	3	1,875
	Total	38,075	264	99	6	38,444
2005	On BIA Land	107	196	2	2	307
	Not on BIA Land	37,364	49	91	8	37,512
	Unknown Latitude/Longitude	1,377	32	19	5	1,433
	Total	38,848	277	112	15	39,252
2006	On BIA Land	99	224	1	4	328
	Not on BIA Land	36,886	51	58	24	37,019
	Unknown Latitude/Longitude	1,243	43	10	5	1,301
	Total	38,228	318	69	33	38,648
2007	On BIA Land	101	232	1	4	338
	Not on BIA Land	35,979	51	72	8	36,110
	Unknown Latitude/Longitude	963	21	2	1	987
	Total	37,043	304	75	13	37,435
2008	On BIA Land	116	168	1	0	285
	Not on BIA Land	33,318	29	53	2	33,402
	Unknown Latitude/Longitude	461	16	8	0	485
	Total	33,895	213	62	2	34,172
2009	On BIA Land	102	173	1	0	276
	Not on BIA Land	30,132	36	51	3	30,222
	Unknown Latitude/Longitude	326	33	4	1	364
	Total	30,560	242	56	4	30,862

---

[2] FARS collected them in 1999 and 2000 but they were mostly unknowns, so we focused on 2001 and on.
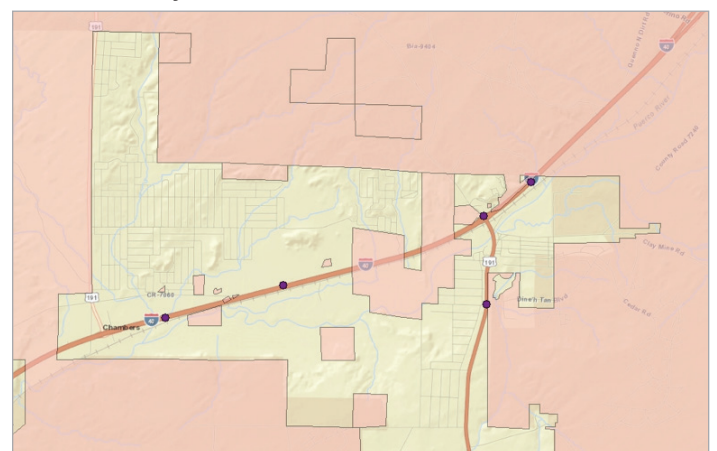
Table 1 (continued)

Year by Derived BIA Element Using Geospatial Software		Special Jurisdiction (FARS)				Total
		No Special Jurisdiction	Indian Reservation	All Other Special Jurisdictions	Unknown	
2010	On BIA Land	77	165	4	0	246
	Not on BIA Land	29,586	38	47	6	29,677
	Unknown Latitude/Longitude	330	30	3	10	373
	Total	29,993	233	54	16	30,296
2011	On BIA Land	95	179	1	0	275
	Not on BIA Land	29,076	34	49	11	29,170
	Unknown Latitude/Longitude	381	32	4	5	422
	Total	29,552	245	54	16	29,867
2012	On BIA Land	87	144	1	0	232
	Not on BIA Land	30,348	36	44	8	30,436
	Unknown Latitude/Longitude	286	37	11	4	338
	Total	30,721	217	56	12	31,006
2013	On BIA Land	77	140	0	0	217
	Not on BIA Land	29,525	33	70	2	29,630
	Unknown Latitude/Longitude	324	29	1	1	355
	Total	29,926	202	71	3	30,202
2014	On BIA Land	95	162	0	0	257
	Not on BIA Land	29,527	31	74	7	29,639
	Unknown Latitude/Longitude	125	27	3	5	160
	Total	29,747	220	77	12	30,056
2015	On BIA Land	73	186	1	1	261
	Not on BIA Land	32,000	36	85	15	32,136
	Unknown Latitude/Longitude	116	22	0	4	142
	Total	32,189	244	86	20	32,539
2016	On BIA Land	67	193	0	0	260
	Not on BIA Land	33,802	30	70	51	33,953
	Unknown Latitude/Longitude	177	20	2	27	226
	Total	34,046	243	72	78	34,439
2001–2016	On BIA Land	1,524	2,677	16	12	4,229
	Not on BIA Land	524,771	606	1,052	163	526,592
	Unknown Latitude/Longitude	20,251	725	165	86	21,227
	Total	546,546	4,008	1,233	261	552,048

Sources: FARS 2001–2015 Final File, 2016 Annual Report File; Derived BIA Element Using Geospatial Software

Overall for the years 2001 to 2016 FARS coded 4,008 fatal crashes on Native American reservations as special jurisdiction, as compared to 4,229 fatal crashes that occurred on BIA land using the geospatial software. Upon closer examination:

1. 606 fatal crashes that were coded "Native American Reservation" by FARS were not spatially located on BIA land. When looking specifically at these crashes and spot-checking their locations on the map, the following were observed:

   a. Many of these crashes seem to be located at Native American casinos, Native American villages, etc.

   b. Many are located in small pockets of land that are completely surrounded by BIA land (See Image 1 as an example).

Image 1
FARS Crashes Located Within Spatial Pockets of Land Surrounded by BIA Land

2. 1,552 fatal crashes were on BIA land, but were coded as no special jurisdiction, all other special jurisdictions, or unknowns. Referring to Image 2 as an example, there were FARS crashes in close proximity within BIA land, where some were coded "SP_JUR=3" and others were coded "SP_JUR=0".

Image 2
FARS Crashes Located on BIA Land But Some Were Coded "SP_JUR=0"
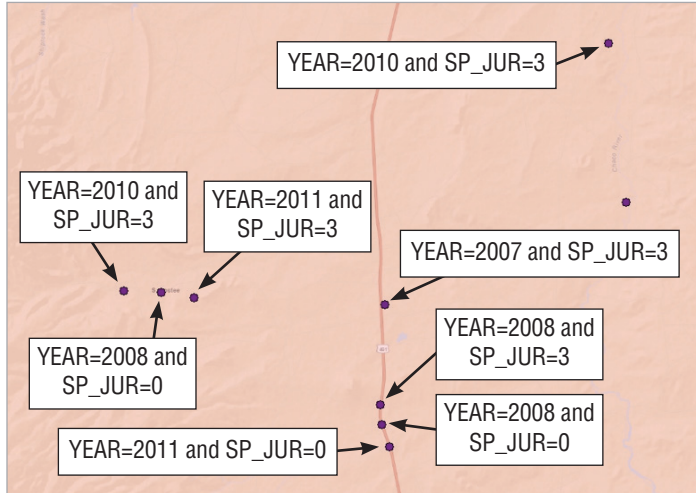
In summary, the FARS special jurisdiction coding is not 100 percent accurate and the derived BIA elements using the geospatial software are not 100 percent complete. Therefore, the proposed methodology for identifying fatal motor vehicle crashes that occurred on Native American reservations is counting crashes where the special jurisdiction coding is 3 (SP_JUR=3) or the BIA land coding is 1 (BIA=1). This methodology resolves the inconsistency of accidents being on BIA land but not coded as SP_JUR=3 (related to Image 2). However, the FARS special jurisdiction accuracy is still unresolved (related to Image 1).

Using this proposed methodology, Table 2 summarizes the fatal motor vehicle crashes and fatalities that occurred on Native American reservations for the years 2001 to 2016. In 2016 there were 380 motor vehicle fatalities that occurred on Native American reservations based on this new methodology, as compared to 298 fatalities reported in FARS and 321 fatalities identified from BIA. In other words, the fatality count for 2016 increased by 28 percent from the old methodology (298 fatalities reported in FARS) to the new methodology (380 fatalities).

Table 2
Fatal Motor Vehicle Crashes and Fatalities That Occurred on Native American Reservations, 2001–2016

| Year | Fatal Crashes | | | Fatalities | | |
	Special Jurisdiction (FARS) Native American Reservation	Derived BIA Element Using Geospatial Software	*BIA or Special Jurisdiction (FARS) Native American Reservation	Special Jurisdiction (FARS) Native American Reservation	Derived BIA Element Using Geospatial Software	*BIA or Special Jurisdiction (FARS) Native American Reservation
2001	226	167	309	257	185	346
2002	288	254	412	342	304	490
2003	272	237	385	325	277	459
2004	264	289	376	322	351	456
2005	277	307	388	320	366	455
2006	318	328	422	368	376	484
2007	304	338	410	366	399	488
2008	213	285	330	251	333	384
2009	242	276	345	282	317	399
2010	233	246	314	274	290	364
2011	245	275	341	279	314	388
2012	217	232	305	262	287	367
2013	202	217	279	234	247	316
2014	220	257	315	259	293	359
2015	244	261	319	285	298	369
2016	243	260	310	298	321	380

Sources: FARS 2001–2015 Final File, 2016 Annual Report File; Derived BIA Element Using Geospatial Software
*Note: Native American reservation crashes identified by the FARS special jurisdiction element and those identified by the derived BIA elements using geospatial software are not mutually exclusive.

FARS Datasets (2001–2016)

For researchers interested in analyzing fatal motor vehicle crashes that occurred on Native American reservations, accident-level auxiliary (ACC_AUX) datasets for years 2001 to 2016 are included when downloading the FARS files for each respective year from this location: ftp://ftp.nhtsa.dot. gov/FARS.

For more information about the FARS datasets and the FARS auxiliary datasets, refer to the two documents:

■ Fatality Analysis Reporting System (FARS) Analytical User's Manual 1975–2016 (www-nrd.nhtsa.dot.gov/ Pubs/812447.pdf)

■ Fatality Analysis Reporting System (FARS) Auxiliary Datasets Analytical User's Manual 2007–2016 (www-nrd. nhtsa.dot.gov/Pubs/812448.pdf)

The following elements can be found in each ACC_AUX dataset for the years 2001 to 2016.

■ ST_CASE – FARS Case Number

■ STATE – FIPS State Code

■ BIA – 1 indicates that the crash occurred on BIA land; 0 otherwise.

■ SPJ_INDIAN – derived from FARS special jurisdiction (SP_JUR=3) element. 1 indicates that the crash occurred on an Indian Reservation; 0 otherwise.

■ INDIAN_RES – 1 indicates either BIA=1 or SPJ_INDIAN=1. This provides a more accurate representation of fatal crashes occurring on Native American reservation.

ACC_AUX datasets can be merged with other FARS data sets by ST_CASE to obtain additional information on these crashes.

Additional Resources

For a recent detailed report on crashes that occurred on Native American reservations, refer to "State Traffic Safety Information (STSI) report—Native American Traffic Safety Facts" (https://cdan.nhtsa.gov/stsi.htm).

For a detailed report on crashes that occurred on Native American reservations using only the FARS special jurisdiction element from 1975 to 2002, refer to "Fatal Motor Vehicle Crashes on Indian Reservations 1975–2002" (https:// crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/809727).

Appendix

The BIA land layer is an extraction from the Protected Areas Database (PAD)-US (Conservation Biology Institution [CBI] Edition) version 1.1 of lands owned by the Bureau of Indian Affairs, Native American Tribes, and Native Alaskan Corporations. Protected areas are the cornerstones around which regional, national and international conservation strategies are developed. Through protected area designations, lands and waters are set-aside in-perpetuity to preserve functioning natural ecosystems, to act as refuges for species, and to maintain ecological processes. Complementary conservation strategies preserve land for the sustainable use of natural resources, or for the protection of significant geologic and cultural features or open space. PAD-US (CBI Edition) attempts to include all available spatial data on these places. For more information about PAD-US 1.1, refer to this link: https://consbio.org/products/projects/pad-us-cbi-edition.

For More Information

This research note was written by Timothy Stewart of the Data Reporting and Information Division and Anders Longthorne of the Mathematical Analysis Division. Both authors are mathematical statisticians in the National Center for Statistics and Analysis, NHTSA. For questions regarding the information presented in this document, please contact timothy.stewart@dot.gov and anders.longthorne@dot.gov.

Suggested APA format citation for this Research Note:

Stewart, T., & Longthorne, A. (2018, February). *Methodology on identifying fatal motor vehicle traffic crashes that occurred on Native American reservations in the United States* (Research Note. Report No. DOT HS 812 475). Washington, DC: National Highway Traffic Safety Administration.

U.S. Department of Transportation
National Highway Traffic Safety Administration

This research note and other general information on highway traffic safety may be accessed by Internet users at: https://crashstats.nhtsa.dot.gov/.