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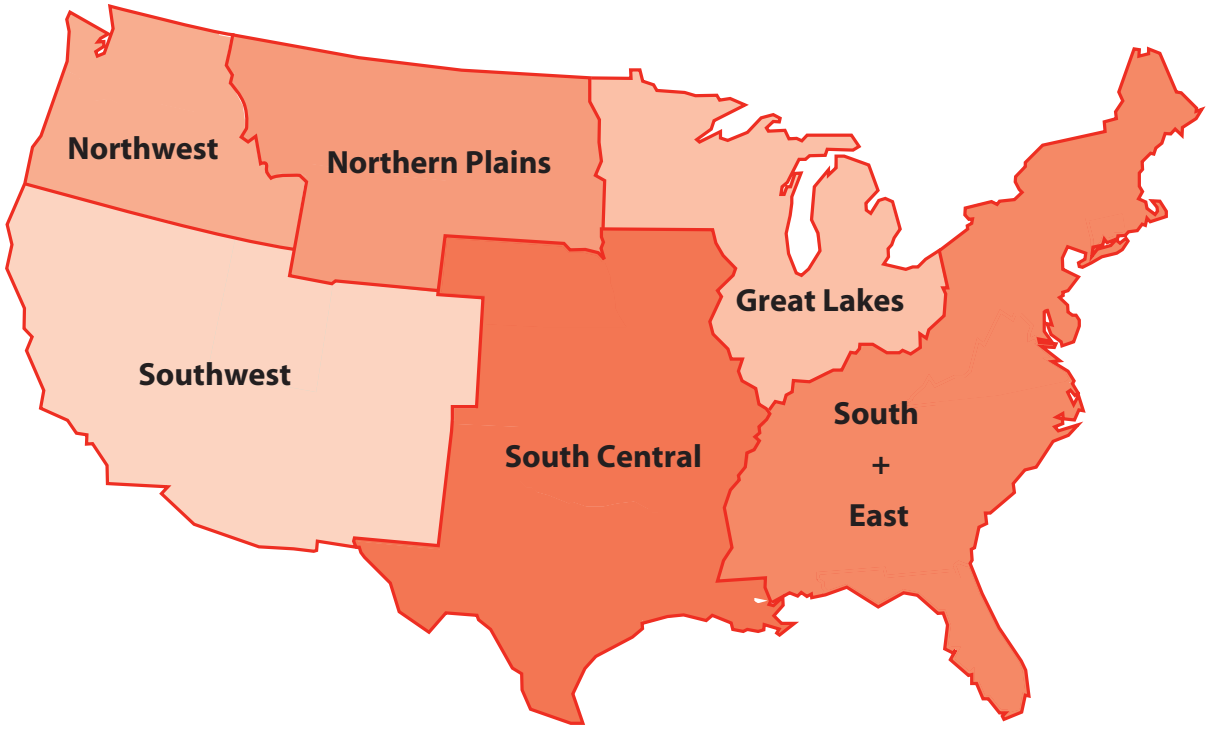
May 2008

2006 Seat Belt Use Estimate for Native American Tribal Reservations



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16. Abstract

The National Highway Traffic Safety Administration and the Bureau of Indian Affairs (BIA), Indian Highway Safety Program, sponsored a project in fall 2004 to (a) establish the first baseline tribal reservation seat belt use rate, and (b) develop a methodology to use in the future to track trends and specific program effects. The planned sample included 18 reservations with 150 sites on these reservations. Ultimately, data were collected from 120 sites on 16 tribal reservations. A subsequent and comparable survey was requested by NHTSA for fall 2006. Seat belt use was observed between September and December 2006 on 15 reservations and in March 2007 on one reservation. For the tribal reservations subject to tribal law and tribal traffic law enforcement, excluding the Navajo Nation, the overall seat belt use rate was 61.8%. When results from the 2004 study are compared to the present study, there was a statistically significant increase in seat belt use. There was a very high variation in belt use across reservations, ranging from a low of 27.7% to a high of 87.8%. Nine tribal reservations had primary seat belt laws; in them, 73.1% of vehicle occupants were belted. By comparison, three tribal reservations had secondary belt laws; they averaged 59.3% belt use. For the four tribal reservations with no belt use law of any kind, only 37.2% of the vehicle occupants were belted. Tribal policy and procedures are likely responsible for current levels of seat belt use and can be most effective in establishing and improving seat belt usage levels.

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TECHNICAL SUMMARY

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R.H.B. Chaffe, M.G. Solomon, and W.A. Leaf	

Background

This paper documents the first replication of the process to determine the tribal reservation seat belt use rate. The National Highway Traffic Safety Administration and the Bureau of Indian Affairs (BIA), Indian Highway Safety Program sponsored a project in 2004 to (a) establish the first baseline tribal reservation seat belt use rate, and (b) develop a methodology to use in the future to track trends and specific program effects (Leaf & Solomon, 2005). This is similar to NHTSA's National Occupant Protection Usage Survey (NOPUS), a probability-based survey that reports a single belt use rate for the nation. The goal was to gather a single belt use rate for tribal reservations that could track progress towards increasing belt use. The results of this survey effort are comparable to the initial survey effort.

Methods

The sampling plan developed in 2004 was designed to provide a reliable estimate of belt use across all the tribal reservations subject to tribal law and tribal traffic law enforcement. The sampling procedure weighted all tribal reservations proportional to their populations, and included the criteria that the sample of the tribal reservations:

- be limited to tribal reservations with populations of 2,000 or more;
- represent varying conditions;
- be from all areas of the country; and
- include enough sites per reservation so that the final combined seat belt use rate would be reliable.

The objective was a sample from each area at a rate of approximately 1 in 4 reservations or 1 reservation per 30,000 population. The planned sample included 18 reservations with 150 sites on these reservations. However, the Navajo reservation in the Southwest, which has 22% of the total Native American population, did not permit seat belt observations to be made in its territory. Ultimately, data were collected from 120 sites on 16 tribal reservations. This was true for both the initial study and this subsequent replication.

Results

Seat belt use on tribal reservations subject to tribal law and tribal traffic law enforcement was observed between September and December 2006 (15 reservations) and in March 2007 (1 reservation). Overall, 44% of the vehicles were cars, 29% were pickups, 17% were SUVs, and 9% were vans. Fifty-nine percent of the drivers were male, 40% were female, and the sex of 1% could not be determined. Fifty-nine percent of the passengers were female, 39% were male, and the sex of less than 1% of the passengers could not be determined (does not sum to 100 due to rounding). Belt use could be coded for 98% of the drivers and 96% of the passengers.

For the tribal reservations subject to tribal law and tribal traffic law enforcement, the overall seat belt use rate was 61.8%. There was a very high variation in belt use across reservations, ranging from a low of 28% to a high of 88%.

Seat Belt Use by Vehicle, Occupant, Area, and Road Type

	Drivers		Passengers		Drivers and Passengers	
	Percent Belted	Number[1]	Percent Belted	Number[1]	Percent Belted	Number[1]
All Cases	62.9%	9,737	58.5%	3,041	61.8%	12,778
Vehicle Type						
Auto	64.0%	4,303	58.6%	1,396	62.4%	5,699
Pickup	57.0%	2,842	52.8%	753	55.8%	3,595
SUV	67.3%	1,665	67.0%	541	67.2%	2,206
Van	70.5%	927	71.6%	351	69.5%	1,278
Occupant Sex						
Male	59.7%	5,756	55.0%	1,196	58.4%	6,952
Female	67.7%	3,947	62.1%	1,831	66.3%	5,778
Area & Road Type						
Urban/Collector	64.9%	5,371	60.1%	1,637	63.7%	7,008
Rural/Arterial	60.1%	4,366	57.5%	1,404	59.7%	5,770

[1]Included total number where belt use was observed and recorded; does not include cases in which belt use was unknown.

There were differences in belt use by vehicle type and occupant sex for drivers and passengers, consistent with patterns seen in State and national belt use results. Rates were higher for cars (62.4%), SUVs (67.2%) and vans (69.5%) and lower for pickup trucks (55.8%). Percent belted for drivers and passengers and subsets of vehicle type, occupant sex and road type were weighted to account for differences in tribal areas.

Males were less likely to use seat belts than females, 58.4% versus 66.3%. Drivers were somewhat more likely to be belted (at 62.9%) than passengers (at 58.5%). The lowest overall belt use rate was for male passengers in pickups, at just 48.6%. The highest rate was for female drivers of vans, 74.0% belted.

Belt use also varied consistently with road type. Within towns on collector roads, overall belt use was 63.7%, while the rate on more rural (between-town) arterials was 59.7%.

Three of the areas had multiple reservations. The Northern Plains area had five of the lowest six belt use rates and collectively averaged just 38.9% belt use across all five. Great Lakes and Northwest had the highest belt use; 2 of the 4 reservations in those two areas had the highest individual belt use rates observed. Of the 5 reservations in the Southwest, 3 had moderate belt use figures, while the other 2 had rates above 70% and 80% respectively; among the higher rates for tribal reservations.

Another indication of belt use is the kind of seat belt law. There are two kinds of belt use laws that may affect use rates: the seat belt law of the reservation itself and the seat belt law of the State in which the tribal reservation is located. Data were examined in both ways. Nine reservations had primary seat belt laws; in them, 73.1% of vehicle occupants were belted. By comparison, 3 tribal reservations had secondary belt laws; they averaged 59.3% belt use. For the 4 reservations with no belt use laws of any kind, only 37.2% of the vehicle occupants were belted.

In addition, 9 reservations were located in States with primary belt use laws. Eight of those nine reservations had the highest use rates; overall, the 9 averaged 75% belted occupants. The remaining 7 reservations, in States with secondary belt use laws, were among the lowest-usage reservations. They averaged just 45% buckled occupants.

Overall, seat belt use in tribal reservations subject to tribal law and tribal traffic law enforcement varies greatly. The recorded figures ranged from less than 28% to almost 88%, a difference so large as to make it unmistakable that different reservations are fundamentally different in their approach to and success at encouraging seat belt use.

Conclusions

This is the second time seat belt use has been systematically measured across a representative sample of Native American reservations. The procedure used was identical to the previous study, intending to provide a moving picture of seat belt use on Native American tribal reservations. It will be a useful tool in measuring the results of continual seat belt initiatives.

Seat belt use varied greatly from tribal reservation to tribal reservation, as in the previous study. Figures ranged from less than 28% to almost 88%, a difference so large as to make it unmistakable that different tribal reservations are fundamentally different in their approach to and success at encouraging seat belt use.

Both the first and second surveys that estimated belt use across Native American tribal reservations found that the tribal reservations with the highest belt use rates had usage rates comparable to general U.S. belt use rates, providing evidence that Native American governments can be effective in achieving high levels of belt use. Figures for low usage tribal reservations suggest that their governments have done little or nothing toward achieving high belt use. Reservations with primary seat belt laws typically had the highest use rates, followed by reservations with secondary seat belt laws. Reservations with no seat belt laws had the lowest use rates. States that add a seat belt law or changing from a secondary law to a primary law have shown increased seat belt use when these laws are enforced. Upgrading the belt laws in tribal reservations lacking them could initiate improvements in belt use. Tribal policy and procedures are likely responsible for current levels of seat belt use, and it is in these areas that tribal efforts can be most effective in establishing and improving seat belt usage levels.

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I. Introduction

This report defines the state of seat belt use on Native American tribal reservations for 2006 and is a tool for use in problem identification and comparison with national and State seat belt use rates.

There are 562 federally recognized tribal governments in the United States. The 562 tribal nations collectively make up the "Indian State" eligible for Section 402 funding under Chapter 4 of the Title 23, United States Code.[1] The Bureau of Indian Affairs administers the Indian Highway Safety Program and serves as the Governor's Highway Safety Representative and focal point of coordination for the Indian State. The Indian State is appropriated highway safety grant funds in the same manner as all other States and eligible U.S. Territories and is subject to setting performance-based programming goals for reducing motor vehicle crashes, fatalities, and injuries and for reporting progress in achieving those goals.

Effective for 1998, NHTSA established revised guidelines for State Seat belt Use Survey designs to measure progress in increasing seat belt use rates in a comparative and consistent manner throughout the country. The purposes were to provide a survey design comparable to other State surveys and determine a baseline seat belt use rate for Indian State. This design was also meant to be replicated (as it was in 2006) to document differences in seat belt use over time.

The sampling plan developed in 2004 determined which tribal reservations qualified for seat belt use measurement. Although the Native American reservations are sovereign entities, the governments of a number of the tribal reservations do not set or enforce traffic laws including seat belt use requirements on all or part of reservation roadways. In order to focus on Native American-controlled belt use, we limited our seat belt use observations to areas subject to tribal law and tribal law enforcement. It is in those areas that tribal policy and procedures are directly responsible for current levels of seat belt use, and it is in these areas that tribal efforts can be most effective in establishing and improving seat belt usage levels.

In 2004, approximately 180 federally recognized tribal reservations within the 48 contiguous States were subject to tribal law and tribal traffic law enforcement and were therefore eligible for the sample. Total population on these tribal reservations was about 712,000 people, which represents 75% of the total 944,000 population for all Native American Reservation and Off-Reservation Trust Lands in the 2000 U.S. Census.

Individual tribal reservations vary greatly in terms of population. The largest is the Navajo Nation, which spans parts of Arizona, New Mexico and Utah (population 155,214). The next largest is the Osage Tribe in Oklahoma (44,437). These two tribal reservations contain 28% of the population of the Indian State. Eleven tribal reservations have fewer than 100 residents.

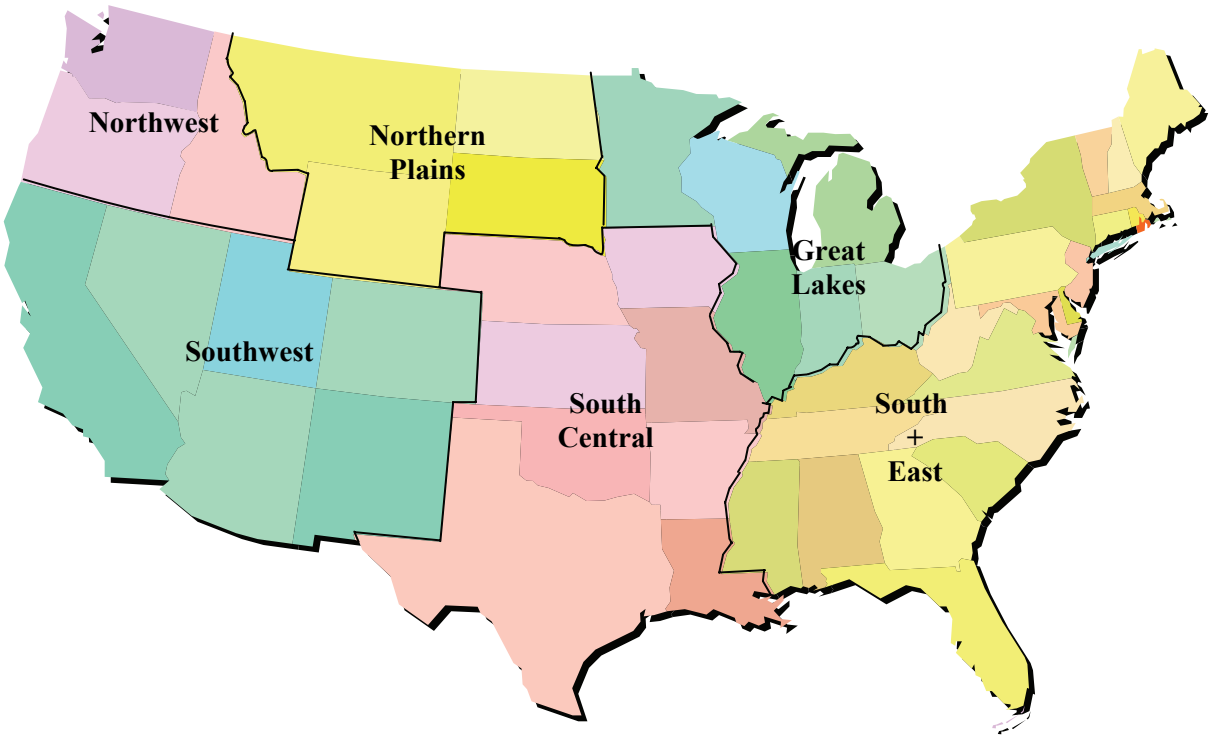
For the purposes of seat belt use observations, all qualified tribal reservations with total populations of 2,000 or more were eligible for selection into the observation sample. Sixty-one tribal reservations were eligible for selection, and they are listed in Appendix C. At the time the sample was drawn, these reservations had a total population of about 660,000, or 93% of the

[1] The Indian States State/BIA may or may not have direct access to other highway safety program funds allocated under Title 23, USC. For example, the Indian State "State" did not have direct access/eligibility to Section 157 or other funding under Chapter 1, Federal Aid Highways Program, but did have access to Section 2003(b) funding.

total Indian State population. Native Americans made up 60% of the population on the 61 reservations versus 61% on all Indian State reservations. The remaining Native American tribal reservations are listed in Appendix D.

It was the judgment of the BIA that, socially and culturally, tribal reservations can be classified in six separate categories that corresponded to distinct geographic "areas": Northwest (Washington State, Oregon, and Idaho), Northern Plains (Montana, Wyoming, North Dakota, and South Dakota), Southwest (California, Nevada, Utah, Colorado, Arizona, and New Mexico), Great Lakes (Minnesota, Wisconsin, Michigan, Illinois, Indiana, and Ohio), South Central (Nebraska, Kansas, Oklahoma, Texas, Iowa, Missouri, Arkansas, and Louisiana), and South and East (all remaining States). These areas became a stratification variable in tribal reservation selection.

Figure 1. Native American Areas



Each of the Native American tribal reservations eligible for the sample had its own road system and could set up its own seat belt use requirements and determine its own level of "compliance emphasis" through publicity and education and enforcement.

II. Methods

Tribal Reservation Selection

There were three major complicating factors in selecting Native America tribal reservations to observe. Together they required a somewhat more structured selection scheme than is used in most State seat belt use observation plans. As noted above, tribal reservations differ markedly in population. Reservations are not contiguous, as are the counties making up a State, but are scattered throughout much of the country. Finally, the same seat belt laws do not apply to all tribal reservations. Reservations are free to set their own seat belt laws. Some tribal reservations have no seat belt laws, some have a primary law, in which motorists can be stopped solely for seat belt violations, and other reservations have a secondary law that allows a law enforcement officer to ticket people for a seat belt violation only if they are already stopped for another infraction. Also, tribal reservations, particularly smaller ones, exist within the "context" of the seat belt laws governing the States within which they are located.

The tribal reservation selection plan was a systematic selection plan based on selecting from within areas, as defined above. General criteria for making up the sample were that it should:

- include enough tribal reservations to be representative of the varying conditions that exist;
- sample from all areas of the country, again to be representative; and
- include enough sites per tribal reservation so that the final combined seat belt use rate would meet the reliability requirements of NHTSA's Section 157 guidelines.[2]

In addition, the sample was to be realistic within the scope of resources available for this effort – and, by extension, make it possible for future replications to track changes in belt use over time and with changing legal and countermeasure conditions.

The final recommendation asked for a total of about 150 sites to be sampled across 18 tribal reservations. These numbers represented our best estimate of a sampling plan meeting the criteria above while remaining within the project's practical constraints. Two of the tribal reservations did not permit seat belt observations to be made in their territory, resulting in final data collection for 120 sites in 16 reservations.

Table 1 shows, by area, the numbers and populations of tribal reservations, totals and "available for sampling." The table also shows the recommended distribution of sampled tribal reservations across areas. The objective of the sampling procedure was to select tribal reservations according to probabilities generally proportional to their populations, based on two steps:

1. Include the Navajo reservation (Southwest Area), which has 22% of the total Indian State population and 35% of the Native American population on tribal reservations.

[2] Though this project was not conducted under Section 157, the observation plan was designed and implemented consistent with Section 157 guidelines so that the results would be readily interpretable.

2. Sample, from each area, at a rate of approximately one in four tribal reservations or one tribal reservation per 30,000 population.

Table 1. Distribution of Native American Tribal Reservations and Population.

Area	Total Reservations Number	Total Reservations Population	Reservations Over 2,000 Pop Number	Reservations Over 2,000 Pop Population	Number to Sample [2]
Southwest [1]	71	322,023	21	293,301	6-1
South Central	11	52,850	2	48,856	1
South & East	33	33,496	6	26,369	2-1
Northwest	29	101,425	11	94,513	3
Northern Plains	20	162,659	17	159,293	5
Great Lakes	13	39,797	4	37,738	1
Total	**177**	**712,250**	**61**	**660,070**	**18-2**

[1] Includes Navajo Reservation in all cells.
[2] Reflects inability to collect data on Navajo (Southwest) and Seneca Nation's Cattaraugus (South & East) reservations.

Sampling procedures were repeated within each Area and involved seven steps:

1. Randomly reorder the list of tribal reservations so that every reservation had equal probability of being first, second, etc., in the list.

2. Set each tribal reservation's initial weight for being selected on a single selection equal to the proportion of the reservation's population to the total population of all eligible reservations within the Area, $w_{ij} = Pop_{ij} / \sum_j Pop_{ij}$, where w_{ij} = initial weight for selection on a single selection for reservation j within Area i, Pop_{ij} = population of reservation j within Area i, and $\sum_j Pop_{ij}$ = sum of the population of all reservations eligible for selection within Area i. (Within each area, these initial weights add to exactly 1.0.)

3. For areas sampling a single tribal reservation, set the selection cutoff level $s_{ij} = w_{ij}$.

4. For areas sampling more than one tribal reservation, adjust the cutoff levels to select all of the tribal reservations in a single sampling according to the formula:

$$s_{ij} = (1-(1-w_{ij})^{n_i}) \bullet n_i / \sum_j (1-(1-w_{ij})^{n_i}) \qquad (1)$$

where s_{ij} = selection cutoff level for reservation j in Area i and n_i = number of reservations to be selected within Area i. (Within Area i, the sum of the adjusted weights = n_i.) In all cases, the s_{ij} cutoff levels correspond roughly to the probability of the reservation being included in the final sample.

5. Generate a random number (from a rectangular distribution between 0 and 1) for each tribal reservation.

6. Starting at the top of the list, select for inclusion each tribal reservation whose random number is less than (or equal to) its adjusted selection cutoff, up to the number required to be sampled.

7. If the number of tribal reservations selected is less than the number required, select additional tribal reservations from the pool, selecting first the one whose random number exceeds its cutoff level by the least amount, etc., until the number of required tribal reservations has been identified.

The resulting target sample of 18 tribal reservations, together with the proposed number of observation sites as described below, is shown in Table 2. Note that the Navajo and Seneca Nations are shaded; they did not participate.

Table 2. Final Sample of 18 Tribal Reservations.

Tribe	Location	Area	State Primary Law?	Population	% Native Amer. [1]	# Sites
Navajo Nation (AZ-NM-UT)	Window Rock, AZ	SW	No/Yes	155,214	96%	27
Ute Indian Tribe (Uintah and Ouray Reservation)	Ft Duchesne, UT	SW	No	19,182	14%	9
Gila River Pima-Maricopa	Sacaton, AZ	SW	No	11,257	92%	7
Pueblo of Zuni	Zuni, NM	SW	Yes	7,758	96%	6
Taos Pueblo	Taos, NM	SW	Yes	4,484	30%	5
Pueblo of Acoma	Acomita, NM	SW	Yes	2,802	97%	4
Osage Tribe	Pawhuska, OK	So-Cent	Yes	44,437	14%	14
Eastern Band of Cherokee	Cherokee, NC	So+East	Yes	8,092	82%	6
Seneca Nation of Indians [Cattaraugus Reservation]	Erie, Chautaqua, Cattaraugus Counties, NY	So+East	Yes	2,412	88%	4
Yakama Nation	Toppenish, WA	NW	Yes	31,646	23%	12
The Tulalip Tribes	Marysville, WA	NW	Yes	9,246	22%	7
Confederated Tribes of the Colville Reservation	Nespelem, WA	NW	Yes	7,582	60%	6
Eastern Shoshone & Arapaho Tribes [Wind River Reservation]	Ft Washakie, WY	NoPlns	No	23,245	28%	10
Rosebud Sioux	Rosebud, SD	NoPlns	No	9,050	86%	6
Cheyenne River Sioux	Eagle Butte, SD	NoPlns	No	8,466	74%	6
Crow	Crow Agency, MT	NoPlns	No	6,894	75%	6
Three Affiliated Tribes [Ft. Berthold]	New Town, ND	NoPlns	No	5,915	67%	5
Saginaw Chippewa [Isabella Reservation]	Mt. Pleasant, MI	GrLks	Yes	25,822	5%	11

[1] Percent of reservation's total population who are Native American; source, 2000 U.S. Census Data.

Site Selection

The site selection procedure was applied independently for each tribal reservation.

Roads in and immediately around the population centers were treated as one stratum ("collectors"), and the major connecting roads were treated as a second stratum ("arterials"). For each tribal reservation with an even number of sites, half of the final observation sites were from each stratum; for each tribal reservation with an odd number of sites, one stratum provided one more site than the other.

In order to avoid roads with very little traffic, a structured selection of observation sites was made based on the use of the roads and their likely volume. Roads eligible for sampling were: paved or gravel (excluded dirt and unimproved); under BIA or tribal control (excludes State and county highways patrolled by State and county police); and collectors or arterials (excluded local streets). Eligible roads were divided into segments, i.e., stretches of roads between intersections large enough for significant changes in the road's traffic volume or makeup.

For each tribal reservation, lists of possible road segments were assembled from qualified road segments that were likely to have adequate traffic volume. Lists were based on road maps and input from local authorities. Population centers were identified, and the main roads within the centers and providing access in and out of the centers were identified. Each access road was included from the center out into more rural areas for a few miles. In addition, major connecting roads with adequate traffic but not near population centers were included.

From the eligible roads, segments for seat belt observation were selected randomly, with the probability of selection proportional to the length of the segment. Specific observation points were selected on the segment by the observers in the field, based on ease of observing belt use and safety. Observation points were documented so that they could be used in future belt use studies.

Traffic counts were determined for each location at the time of belt use observations. These counts served as our estimate of traffic density. At locations where every passing vehicle could be observed, the count was equal to the number of vehicles observed. Where traffic volumes were too heavy to permit observation of every vehicle, we conducted a 10-minute traffic count before belt use observations, conducted a second 10-minute count after observations, and weighted the number of observations as a function of the number of vehicles counted (i.e., the estimate of the number of vehicles that would have been observed had we been able to observe every vehicle). At most sites, where traffic volumes permitted, observations and traffic counts included traffic in both directions.

We proposed 150 total sites. This is similar to the numbers of sites used for State belt use determinations, and thus was judged likely to provide a suitably stable overall estimate of belt use. The number of sites per tribal reservation was proportional to the square root of the population. The numbers are shown in Table 2 above. For example, if there are a total of 151 observation sites (varied from the target of 150 due to rounding), there would be 27 sites on the Navajo Nation and 4 sites on a small reservations with just over 2,000 population. No reservation had fewer than 4 sites.

We were unable to obtain permission to collect seat belt observations on the Navajo and Cattaraugus reservations. That left a total of 120 observation sites (the defections were confirmed too late to adjust the numbers of sites on other tribal reservations). Even with the smaller number of sites, and the large variability of belt use rates between sites and tribal reservations, the final overall seat belt use rate estimate met the Section 157 target for reliability.

The calculated seat belt use percentage for each tribal reservation was the combination of belt use percentages at each site weighted directly by the number of vehicles passing during the observation period and inversely by the likelihood of selection of the segment (i.e., the segment length). (For sites where vehicle volume was estimated from pre- and post-observation counts, those estimated values were used.) For each site, the belt use percentage was the number of belted persons observed divided by the total number of persons for whom belt use/nonuse was observed. The same arithmetic was used to calculate seat belt usage for subsets, e.g., males, drivers, pickup drivers, or passenger car occupants. Weights for combining sites for subsets were the total vehicle counts, based on the assumption that distributions of subsets are balanced across sites and that the total vehicle count is the most stable estimate.

Data Collection

Observers

Observers were hired by Preusser Research Group. All observers had done seat belt observations prior to this project. All observers received extensive training over several days, first watching an expert observer, then observing in parallel, then observing with supervision.

Scheduling

Observations were conducted Monday-Sunday during daylight hours, between 7 a.m. and 6 p.m. Scheduling was done to balance observations for time of day and day of week, with weekdays being considered roughly equivalent for the purposes of efficient use of observer field and travel time. Observations were balanced by type and time of day within areas and, as much as practicable, within tribal reservations.

Observations

Data collection was done according to the instructions in Appendix A. Each observation period lasted a full hour. Survey information was recorded on an observation data collection form (Appendix B). The form was designed so that pertinent site information could be documented, including tribal reservation name, city/town/area identifier, exact roadway location, date, day of week, time, weather condition, and direction(s) of traffic flow and lane(s) observed. Each one-page form included space to record information for 70 vehicles, the driver of each vehicle, and the outboard, front-seat passenger, if any.

Calculation of Overall Seat Belt Usage Rate and Variability

Overall Rates

Seat belt usage rates were calculated in two stages. Within each reservation, usage was

$$p_{ij} = (\sum_{k} (V_{ijk} / \pi_{ijk}) * (B_{ijk} / O_{ijk})) / (\sum_{k} (V_{ijk} / \pi_{ijk})) \quad (2)$$

where p_{ij} = seat belt usage for reservation j in Area i, k = site within the reservation, V_{ijk} = weight for each road segment (site), $\pi_{ijk} = n_{ij} L_{ijk} / \sum_{k=1}^{n_{ij}} L_{ijk}$ = the proportion of the length L that road segment ijk is of the chosen road segments in reservation j in Area i, B_{ijk} = number of belted occupants (drivers and outboard, front-seat passengers) observed at the site, and O_{ijk} = total number of occupants observed at the site. For sites where all vehicles were observed, V_{ijk} = the number of observed vehicles. For sites where the number of vehicles were estimated from 10-minute counts before and after the observation period, V_{ijk} = (number counted 10 minutes before + number counted 10 minutes after) * 60/20, for a standard 60-minute observation period. Where raw counts were based on travel in both directions, they were divided in half to be comparable to counts based on travel in only one direction.

Values for $\pi_{ijk} = n_{ij} L_{ijk} / \sum_{k=1}^{n_{ij}} L_{ijk}$ were calculated separately within each stratum for each tribal reservation. The actual calculations are represented as $\pi_{ijkl} = (n_{ij} / 2) \bullet L_{ijkl} / \sum_{k=1}^{n_{ijl}} L_{ijkl}$, where l is the stratum and $n_{ij1} + n_{ij2} = n_{ij}$. The result of this was that collectors and arterials contributed equally to each reservation's belt use rate estimate, regardless of differences in the total length of the selected collector segments versus the total length of the selected arterial segments.

Next, the overall rate across all tribal reservations was calculated according to the formula

$$p = (\sum_{i,j} W_{ij} p_{ij}) / (\sum_{i,j} W_{ij}) \quad (3)$$

where $W_{ij} = Pop_{ij} / s_{ij}$, i.e., the population of tribal reservation i in Area j times the inverse of the selection cutoff level, where the cutoff level was approximately equal to the probability of including tribal reservation j of Area i in the sample. This is the directly analogous to the Section 157 guidelines allowing population weighting in the absence of traffic volume data.

At an informational level, calculations of belt use could also be done for subsets of the entire sample and population. For example, BIA and PRG were interested in belt use rates for the different areas. It was also interesting to compare tribal reservations with primary seat belt laws

versus those with secondary or no seat belt laws, and tribal reservations within States with primary laws versus those in States with secondary laws.

Additionally, a large percentage of tribal reservation vehicles were pickup trucks, and in State belt use observations it is routinely found that belt use in pickup trucks is much less than that in all other passenger vehicle types. Thus it was of interest to calculate seat belt use rates for subsets of vehicle types, as well as male/female and driver/passenger subsets.

All of these "subset" calculations use formulas (2) and (3) as defined above, with adjustments in formula (2) to B_{ijk} and O_{ijk} (but not V_{ijk}) to reflect different subsets of vehicles or occupants and adjustments to the specific tribal reservations included in the formula (3) computations (but no changes to the W_{ij} values) for different Area or other tribal reservation subsets.

The Standard Error of the Overall Seat Belt Use Rate

Standard error of estimate values were estimated through a jackknife approach, based on the general formula:

$$\hat{\sigma}_p = [\frac{n-1}{n}\sum_{i=1}^{n}(p_i - p)^2]^{1/2} \quad (4)$$

where $\hat{\sigma}_p$ = standard deviation (standard error) of the estimated Native American tribal reservation seat belt use proportion p, n = the number of sites, i.e., 120, and p_i = the estimated Native American tribal reservation belt use proportion with site i excluded from the calculation.

The relative error rate, i.e., $\hat{\sigma}_p / p$, also was calculated, as was the 95% confidence interval, i.e., $p \pm 1.96\hat{\sigma}_p$. These values are reported for the overall Native American tribal reservation seat belt use rate.

III. Results

Observational data were collected between September and December 2006, except from one tribal reservation, where observations were done in March 2007. Table 3 displays the overall sample characteristics. A total of 9,920 vehicles were observed, with 3,166 additional passengers.

Approximately 44% of the vehicles were cars, 29% were pickups, 17% were SUVs, and 9% were vans. Fifty-nine percent of drivers were male, and 40% were female; gender could not be coded for <1% of drivers. Fifty-nine percent of passengers were female, just 39% were male, and sex could not be coded for 1%. Seat belt use could be coded for 98% of drivers and 96% of passengers.

Table 3. Observation Sample Overview.

Vehicle Type	Passenger Cars	Pickup	SUV	Van	Total
	4,359	2,956	1,699	936	9,920
	44%	29%	17%	9%	
Driver Sex	**Male**	**Female**	**Unknown**		**Total**
	5,855	3,987	75		9,917
	59%	40%	<1%		
Passenger Sex	**Male**	**Female**	**Unknown**		**Total**
	1,245	1,883	38		3,166
	39%	59%	1%		

As shown in Table 4, the overall seat belt use rate for Native American tribal reservation (excluding Navajo) was 61.8%. There was very large variation in belt use across tribal reservations, ranging from a low of 27.7% to a high of 87.8%. Reflecting this variability, the standard error of measurement was 2.5%, and the relative standard error (standard error divided by average belt use) was 4.0%. The 95% confidence interval for overall belt use was 57.0% to 66.6%.

There were significant differences in belt use by vehicle type and occupant gender for drivers and passengers.% belted for drivers and passengers and subsets of vehicle type, occupant sex and road type were weighted to account for differences in traffic density observed among tribal areas. Rates were higher for occupants in passenger cars (62.4%), SUVs (67.2%), and vans (69.5%) and much lower for pickup trucks (55.8%). Lower belt use among occupants riding in pickup trucks is also common across all roadways in the United States.

Males were less likely to use safety belts than females, 58.4% versus 66.3%. Drivers were somewhat more likely to be belted, at 62.9%, than passengers, at 58.5%. The lowest overall belt use rate was for male passengers in pickups, at just 48.6%. The highest rate was for female drivers of vans, 74.0% belted.

Belt use also varied consistently by road type. Within towns on collector roads, overall belt use was 63.7%, while the rate on the more rural between-town arterials was 59.7%.

Table 4. Seat Belt Use, by Vehicle, Occupant, Area, and Road Type.

	Drivers		Passengers		Total	
	Belt Use	N	Belt Use	N	Belt Use	N
All Cases	62.9%	9,737	58.5%	3,041	61.8%	12,778
Vehicle Type						
Auto	64.0%	4,303	58.6%	1,396	62.4%	5,699
Pickup	57.0%	2,842	52.8%	753	55.8%	3,595
SUV	67.3%	1,665	67.0%	541	67.2%	2,206
Van	70.5%	927	71.6%	351	69.5%	1,278
Occupant Sex						
Male	59.7%	5,756	55.0%	1,196	58.4%	6,952
Female	67.7%	3,947	62.1%	1,831	66.3%	5,778
Area and Road Type						
Urban/Collector	64.9%	5,371	60.1%	1,637	63.7%	7,008
Rural/Arterial	60.1%	4,366	57.5%	1,404	59.7%	5,770

Areas

Three of BIA areas had multiple tribal reservations. The Northern Plains Area had five of the six lowest belt use rates and averaged just 38.9% belt use across all five. Great Lakes and Northwest had the highest belt use; two of the four reservations in those two areas had the highest individual belt use rates observed. Of the five reservations in the Southwest, three had moderate belt use figures, while the other two had rates above 70 and 80%, among the highest for the Indian State.

Belt Use Laws

Another indication of belt use is the kind of seat belt law (Table 5). There are two kinds of belt use laws that may affect use rates: the seat belt law of the tribal reservation itself and the seat belt law of the State in which the tribal reservation is located. Data were examined both ways. Nine tribal reservations had primary seat belt laws; in them, 73.1% of vehicle occupants were belted. By comparison, three tribal reservations had secondary belt laws; they averaged 59.3% belt use. For the 4 tribal reservations with no belt use law of any kind, only 37.2% of the vehicle occupants were belted.

Also, nine tribal reservations were located in States with primary belt use laws. Those 9 tribal reservations were the 9 with best use rates; they averaged 75.0% belted occupants. The remaining 7 tribal reservations, in States with secondary belt use laws, were the lowest-usage tribal reservations; they averaged just 45.0% buckled occupants.

Table 5. Seat Belt Use by Law Type and Year of Observation.

	2004		2006	
	Belt Use	N	Belt Use	N
Reservation Law Type:				
Primary	68.60%	7,976	73.10%	8,810
Secondary	53.20%	2,096	59.30%	2,197
None	26.40%	1,876	32.70%	1,771
Surrounding State Law Type:				
Primary	72.80%	8,054	75.00%	9,218
Secondary	33.30%	3,894	45.00%	3,560

2004 and 2006 Survey Comparisons

The 2006 observational data were compared with 2004 observational data. Chi-square analysis provided a statistically significant result ($p<.001$) indicating that belt use improved from 2004 to 2006 across the Indian State. The amount of improvement for drivers and front-outboard passengers equaled 6.4 percentage points.

Table 6. Seat Belt Use by Year of Observation.

	2004**	2006*
	(n=11,947)	(n=12,778)
Driver and Passenger	55.4%	61.8%

*Data from one Native American Reservation were collected in March 2007
** Data from one Native American Reservation were collected in February 2005

Occupant type, gender, vehicle type, and road type were examined for differential belt use and comparisons were made between the 2004 and 2006 survey results to see if differential improvements had occurred. Belt use improved among drivers and passengers, all vehicle types, males and females, and among different road types.

Table 7. Seat Belt Use by Vehicle Type, Occupant Sex, Road Type, and Year of Observation.

	2004				2006			
	Driver		Passenger		Driver		Passenger	
	Use Rate	Number	Use Rate	Number	Use Rate	Number	Use Rate	Number
All Cases	56.60%	9,064	51.30%	2,883	62.9%[1]	9,737	58.5%[1]	3,041
Vehicle Type								
Auto	60.30%	4,122	53.70%	1,431	64.0%[1]	4,303	58.6%[2]	1,396
Pickup	49.20%	2,723	43.90%	736	57.0%[1]	2,842	52.8%[1]	753
SUV	63.50%	1,265	56.10%	392	67.3%[3]	1,665	67.0%[1]	541
Van	58.50%	954	54.70%	324	70.5%[1]	927	71.6%[1]	351
Occupant Sex								
Male	54.00%	5,377	44.40%	1,154	59.7%[1]	5,756	55.0%[1]	1,196
Female	61.30%	3,646	56.70%	1,684	67.7%[1]	3,947	62.1%[2]	1,831
Area & Road Type								
Urban/ Collector	59.50%	5,182	57.20%	1,662	64.9%[1]	5,371	60.10%	1,637
Rural/Arterial	52.20%	3,882	47.90%	1,221	60.1%[1]	4,366	57.5%[1]	1,404

[1] Comparison 2006 to 2004; Significant at p<.001
[2] Comparison 2006 to 2004; Significant at p<.01
[3] Comparison 2006 to 2004; Significant at p<.05

Belt use among both drivers and passengers improved from 2004 to 2006 (Table 7); passenger belt use improved more compared to drivers (6.3 percentage points versus 7.2 points) (p<.001). Driver belt use was measured higher in comparison to passengers both years.

Survey results also indicated notable differences among vehicle types. Belt use measured higher for all vehicle types in 2006 compared to 2004 and improvements were largest among occupants in vans and pickup trucks. Improvement in occupant belt usage was statistically significant at p<.001 among drivers and passengers in pickups and van, among drivers in passenger cars, and among passengers in SUVs. Front-seat passenger belt use improved in passenger cars and that was statistically significant (p<.01). Surveys found that SUV driver belt use also improved (p<.05). Each survey year, occupants in pickup trucks were observed wearing seat belts least often compared to occupants in other vehicle types.

Male occupants wore seat belts less often than female occupants in both survey years. Passenger belt use was lower than driver belt use for both males and females in both survey years. Male and female occupant belt use improved from 2004 to 2006 ($p<.001$); that was true for whether the occupant was a driver or passenger.

Belt usage was higher on urban/collector road types compared to rural/arterial road types in both survey years. That was true for both drivers and passengers. The survey data indicated that statistically significant improvements occurred for both drivers and passengers on rural/arterials ($p<.001$) and among drivers on urban/collectors ($p<.001$) but not for passengers on urban/collectors.

IV. Discussion

This is the second time seat belt use has been systematically measured across a representative sample of Native American reservations. The procedure developed in 2004 was replicated to provide a moving picture of seat belt use in the Indian State. It will continue to be a useful tool when combined with seat belt initiatives.

As noted in 2004 and again here, seat belt use in the Indian State varies greatly from tribal reservation to tribal reservation. The recorded figures ranged from less than 28% to almost 88%, a difference so large as to make it unmistakable that different tribal reservations are fundamentally different in their approach to and success at encouraging seat belt use. Still, it should be noted that there was improvement in the overall use rate (55.4% in 2004 to 61.8% in 2006), mainly due to increases in areas or regions where seat belt was lowest in 2004. It is important to note that figures from individual tribal reservations must be taken as only an indication of true rates, because the sampling plan was designed to provide a reliable estimate of belt use across all the tribal reservations subject to tribal law and tribal traffic law enforcement.

The survey found differences in belt use by vehicle type and occupant gender. That result was similar to what the previous study indicated and similar to findings in State belt use surveys. Occupants of pickup trucks use safety belts less often than occupants of other vehicles, and males buckle up less than females. Also, passengers tend to buckle up less than drivers. As has been noted in other reports (including the previous study), male pickup drivers and passengers would be the target group in need of the greatest improvement. They also seem to be the group most resistant to previous efforts, so they present the greatest challenge to new efforts – efforts that, even though primarily targeting males in pickups may increase belt use in all groups.

The presence of a primary seat belt law is an indicator of higher belt use. Reservations with primary laws had, in general, higher belt use than tribal reservations with secondary laws; reservations with secondary laws had higher belt use than tribal reservations with no belt laws. Furthermore, tribal reservations located inside States with a primary seat belt law were highly correlated with reservation belt use and with reservation belt laws.

It should be noted that from 2004 to 2006, the largest increases in belt use were in those reservations with no laws (26.4% to 37.2%, respectively) and secondary laws (53.2% to 59.3%). And for reservations within secondary law states, there was an 11.7-point increase from 33.3% to 45.0%. This is encouraging given that passage of primary laws has proven to be an infrequent course of action. It should be noted that the implementation of stronger belt use laws have

regularly been followed with increased belt use. Adding primary belt laws in tribal reservations lacking them could lead larger improvements in belt use.

The 2004 study indicated that tribal reservations with the highest belt use rates had rates comparable to general U.S. belt use rates (both the national rate, derived from the National Occupant Protection Use Survey, and individual State rates). The 2006 study found that the comparison of tribal reservations to U.S. States remained consistent, indicating that Native American governments can achieve high levels of belt use. On the other hand, figures for some of the tribal reservations suggest that their governments have done little or nothing toward achieving high belt use. Tribal policy and procedures are likely responsible for current levels of seat belt use, and it is in these areas that tribal efforts can be most effective in establishing and improving seat belt usage levels.

It is unfortunate that the Navajo Nation did not grant permission to observe on their reservation for a second time. The Navajo Nation represents about 16% of the population of qualifying Indian State reservations, and 40% of the intended sample population. The Navajo reservation would have been an important addition to this measurement effort. It is hoped it can be added to subsequent Indian State belt use measurements.

References

Leaf, W.A., & Solomon, M.G. (2005) *Safety Belt Use Estimate for Native American Tribal Reservations*. , Report Number DOT HS 809 921.Washington, D.C.: National Highway Traffic Safety Administration.

Appendix A. Seat Belt Observation Instructions

- Qualifying vehicles include passenger automobiles, pickup trucks, recreational vehicles, jeeps, or vans (private, public and commercial). Pickup trucks should be coded as "trucks." Jeeps, Broncos, Blazers, and other vehicles of that type should be coded as sport utility vehicles. Eligible vehicles should be observed regardless of the State in which they are registered.

- Belt use will be observed for front seat occupants only. Observe and record data for the driver and passenger seated closest to the right side of the front seat. If there is more than one front-seat passenger, observe only the "outside" passenger. The passenger observed need not be in the seat closest to the passenger door, just the passenger closest to that position. Do not record data for passengers in the back seat or for a third passenger riding in the middle of the front seat.

- If a child is present in the front seat in a child restraint seat, do not record anything. However, children riding in the front seat, regardless of age, who are not in child restraint seats, should be observed as any other front seat passenger. If a child is seated on the lap of the right-most seated passenger, code the gender of the lap-owner and N for belt use.

- Each observation period will last for exactly 60 minutes.

The following procedures will be used in conducting observations of seat belt use:

1. As you observe a qualifying vehicle, record the type of vehicle (car, truck, SUV, van), the occupants' sex (male or female), and shoulder restraint use (yes or no) of the front seat occupants (driver and front seat "outside" passenger only).
2. If you notice a lap belt in use without a shoulder belt, it should be recorded as not restrained. Only shoulder belts are to be counted. Even if the vehicle likely has no shoulder belts, code the occupant(s) as not restrained.
3. If the person is using the shoulder belt improperly, e.g., has the shoulder strap under his/her arm or behind the back, this should be recorded as not restrained.
4. If traffic is light enough and you can see well, observe traffic moving in both directions (and indicate it by circling both directions on the form).
5. If you are observing a multiple-lane roadway, if traffic is light enough and you can see well, observe traffic in all lanes. If traffic is too heavy, observe traffic in one lane at a time, each lane for an equal amount of time, and in the direction specified, throughout the 60-minute observation time-period.
6. In many situations, it will be possible to observe every vehicle in the designated lane(s). However, if there is too much traffic for you to observe every vehicle, you should determine a reference point up the road in the appropriate lane. Observe the next vehicle to pass the reference point after the last vehicle has been coded.
7. If you believe there will be too many vehicles to code every one, for 10 minutes immediately before the observation period and for 10 minutes immediately after the observation period, count all passenger vehicles as they pass and write the two tallies on the first data page.
8. Do not observe if it is raining or foggy or if other inclement weather arises. If you arrive at a site and it begins to rain, do not collect data in the rain. Find a dry place and wait 15 minutes to see if the rain stops. If the rain does stop, begin observing again and extend the observation period to make up for the time missed. Otherwise, you will have to reschedule the site. (Note: observer may continue observations in light fog, drizzle, or mist).
9. If more than one data sheet are used, staple the sheets together at the end of the observation period and note the number of sheets used at the top of the first data page.
10. It may happen that the site you are assigned is seriously compromised due to construction. If this occurs, you may move one block in either direction on the same street such that you are observing the same stream of traffic that would have normally been observed had there been no obstruction. If moving one block will not solve the problem, then do not conduct the observation, but follow procedures for identifying and observing at an alternative site.

Appendix B. Native American Seat Belt Observation Data Collection Form

The form, front and back, is shown on the next two pages, full size and without document headers/footers.

Seat Belt Observation Data Collection Form

SITE NUMBER: _____ SITE: _____

NOTES: _____

DATE: _____ - _____ - _____ DAY OF WEEK: _____

DIRECTION OF TRAFFIC FLOW (Circle one or two): N S E W START TIME:_____ (Exactly 1 Hour Observation)

WEATHER
1 Clear / Sunny
2 Light Rain
3 Cloudy
4 Fog
5 Wet But Not Raining

	DRIVER		PASSENGER				DRIVER		PASSENGER		
Veh. #	Vehicle **C = car T = truck S = suv V = van**	Sex **M = male F = female U = unsure**	Use **Y = yes N = no U = unsure**	Sex **M = male F = female U = unsure**	Use **Y = yes N = no U = unsure**	Veh. #	Vehicle **C = car T = truck S = suv V = van**	Sex **M = male F = female U = unsure**	Use **Y = yes N = no U = unsure**	Sex **M = male F = female U = unsure**	Use **Y = yes N = no U = unsure**
1						36					
2						37					
3						38					
4						39					
5						40					
6						41					
7						42					
8						43					
9						44					
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30						65					
31						66					
32						67					
33						68					
34						69					
35						70					

NATIVE AMERICAN SEAT BELT SURVEY FORM 2004

Supplementary vehicle counts: 10 minutes prior: _____ 10 minutes after: _____
Vehicle count based on _____ lanes out of _____ in { one both } direction(s).

NOTES:_____

GPS COORDINATES

N_____

W_____

Altitude_____ft

Site Location Diagram

Appendix C. Native American Tribal Reservations With 2000+ Population

Tribe/Reservation	Related Location	Area	Population		
			Total	Native American	Pct Nat. Am.
Saginaw Chippewa [Isabella Resvn]	Mt Pleasant, MI	GrLks	25,822	1,397	5.4%
Red Lake Band of Chippewa	Red Lake, MN	GrLks	5,162	5,071	98.2%
Keweenaw Bay [L'Anse]	Baraga, MI	GrLks	3,538	850	24.0%
Menominee Indian Tribe of Wisconsin	Keshena, WI	GrLks	3,216	3,061	95.2%
Confederated Salish and Kootenai [Flathead]	Pablo, MT	NoPlns	26,172	6,999	26.7%
Eastern Shoshone & Arapaho Tribes [Wind River Rsvn]	Ft Washakie, WY	NoPlns	23,245	6,542	28.1%
Oglala Sioux [Pine Ridge Rsvn] (SD, NE)	Pine Ridge, SD	NoPlns	14,068	12,985	92.3%
Sisseton-Wahpeton Sioux Tribe [Lake Traverse] [(ND-SD)	Agency Village, ND	NoPlns	10,408	3,453	33.2%
Fort Peck Assiniboine & Sioux	Poplar, MT	NoPlns	10,321	6,391	61.9%
Blackfeet	Browning, MT	NoPlns	10,100	8,507	84.2%
Rosebud Sioux	Rosebud, SD	NoPlns	9,050	7,747	85.6%
Cheyenne River Sioux	Eagle Butte, SD	NoPlns	8,466	6,249	73.8%
Standing Rock Sioux (ND-SD)	Fort Yates, SD	NoPlns	8,250	5,964	72.3%
Crow	Crow Agency, MT	NoPlns	6,894	5,165	74.9%
Yankton Sioux Tribe	Marty, SD	NoPlns	6,500	2,633	40.5%
Three Affiliated Tribes [Ft. Berthold]	New Town, ND	NoPlns	5,915	3,986	67.4%
Turtle Mountain Band of Chippewa	Belcourt, ND	NoPlns	5,815	5,601	96.3%
Northern Cheyenne	Lame Deer, MT	NoPlns	4,470	4,029	90.1%
Spirit Lake [Devils Lake Rsvn]	Fort Totten, ND	NoPlns	4,435	3,317	74.8%
Fort Belknap	Harlem, MT	NoPlns	2,959	2,790	94.3%
Crow Creek Sioux	Fort Thompson, SD	NoPlns	2,225	1,936	87.0%
Yakama Nation	Toppenish, WA	NWst	31,646	7,289	23.0%
Nez Perce	Lapwai, ID	NWst	17,959	2,101	11.7%
The Tulalip Tribes	Marysville, WA	NWst	9,246	2,049	22.2%
Confederated Tribes of the Colville Reservation	Nespelem, WA	NWst	7,582	4,528	59.7%
Coeur D'Alene	Plummer, ID	NWst	6,551	1,251	19.1%
Shoshone-Bannock	Fort Hall, ID	NWst	5,760	3,648	63.3%
Lumni Indian Nations	Bellingham, WA	NWst	4,193	2,114	50.4%
Muckleshoot Indian Tribe	Auburn, WA	NWst	3,597	1,033	28.7%
Confederated Tribes of the Warm Springs Reservation	Warm Springs, OR	NWst	3,311	3,038	91.8%
Swinomish Indian Tribe	LaConner, WA	NWst	2,664	617	23.2%
Spokane Tribe of Indians	Wellpinit, WA	NWst	2,004	1,533	76.5%
Osage Tribe	Pawhuska, OK	So-Cent	44,437	6,410	14.4%
Kickapoo	Horton, KS	So-Cent	4,419	714	16.2%
Eastern Band of Cherokee	Cherokee, NC	So-East	8,092	6,665	82.4%
Seneca Nation of Indians (Allegany Resvn)	Cattaraugus County, NY	So-East	6,804	1,297	19.1%
Mississippi Band of Choctaw	Philadelphia, MS	So-East	4,311	4,087	94.8%
Akwesasne Mohawk Tribe (St. Regis Mohawk)	Hogansburg, NY	So-East	2,699	2,629	97.4%
Seneca Nation of Indians (Cattaraugus Resvn)	Erie, Chautaqua, Cattaraugus Counties, NY	So-East	2,412	2,125	88.1%
Seminole Tribe	Hollywood, FL	So-East	2,051	538	26.2%
Navajo Nation (AZ-NM-UT)	Window Rock, AZ	SWst	155,214	149,423	96.3%
Ute Indian Tribe (Uintah and Ouray Resvn)	Ft Duchesne, UT	SWst	19,182	2,780	14.5%
White Mountain Apache [Ft. Apache]	Whiteriver, AZ	SWst	12,429	11,702	94.2%
Gila River Pima-Maricopa	Sacaton, AZ	SWst	11,257	10,353	92.0%
Southern Ute	Ignacio, CO	SWst	11,159	1,433	12.8%
Santa Clara Pueblo	Espanola, NM	SWst	10,658	1,329	12.5%
Tohono O'odham	Sells, AZ	SWst	10,483	9,417	89.8%
San Carlos Apache	San Carlos, AZ	SWst	9,385	8,921	95.1%
Pueblo of Zuni	Zuni, NM	SWst	7,758	7,426	95.7%
Hopi	Kykotsmovi, AZ	SWst	6,815	6,442	94.5%
Salt River Pima-Maricopa	Scottsdale, AZ	SWst	6,405	3,366	52.6%
Taos Pueblo	Taos, NM	SWst	4,484	1,331	29.7%
Pueblo of Laguna	Laguna, NM	SWst	3,815	3,669	96.2%
Pascua Yaqui	Tuscon, AZ	SWst	3,315	3,002	90.6%
Pueblo of San Felipe	San Felipe, NM	SWst	3,185	2,465	77.4%
Pueblo of Santo Domingo	Santo Domingo Pueblo, NM	SWst	3,166	3,085	97.4%
Pueblo of Isleta	Isleta, NM	SWst	3,166	2,675	84.5%
Mescalero Apache	Mescalero, NM	SWst	3,156	2,888	91.5%
Pueblo of Acoma	Avomita, NM	SWst	2,802	2,723	97.2%
Jicarilla Apache Tribe	Dulce, NM	SWst	2,755	2,475	89.8%
Pojoaque Pueblo	Santa Fe, NM	SWst	2,712	264	9.7%

Appendix D. Native American Tribal Reservations With Less Than 2000 Population

Tribe/Reservation	Related Location	Area	Population		
			Total	Native American	Pct Nat. Am.
Jemez Pueblo	Jemez Pueblo, NM	SWst	1,958	1,941	99.1%
Picuris Pueblo	Penasco, NM	SWst	1,801	166	9.2%
Nambe Pueblo	Santa Fe, NM	SWst	1,765	455	25.8%
Pyramid Lake Paiute	Nixon, NV	SWst	1,734	1,221	70.4%
Ute Moutain	Towaoc, CO	SWst	1,687	1,609	95.4%
Chippewa-Cree [Rocky Boy's]	Box Elder, MT	NoPlns	1,605	1,542	96.1%
San Ildefonso Pueblo	Santa Fe, NM	SWst	1,524	528	34.6%
Pueblo of Cochiti	Cochiti, NM	SWst	1,502	695	46.3%
Onondaga Nation	Nedrwo, NY	So+East	1,473	763	51.8%
Quinault	Taholah, WA	NWst	1,370	1,051	76.7%
Makah	Neah Bay, WA	NWst	1,356	1,083	79.9%
Hualapai	Peach Springs, AZ	SWst	1,353	1,253	92.6%
Lower Brule Sioux Tribe	Lower Brule, SD	NoPlns	1,353	1,237	91.4%
Duck Valley Resvn (NV, ID) (Shoshone and Paiute)	Owyhee, NV, NV	SWst	1,265	998	78.9%
Prairie Band Potawatomie Tribe	Mayetta, KS	So-Cent	1,238	518	41.8%
Tuscarora Tribe	Lewiston, NY	So+East	1,138	311	27.3%
Cocopah	Somerton, AZ	SWst	1,025	519	50.6%
Reno-Sparks	Reno, NV	SWst	881	830	94.2%
Walker River Paiute	Schurz, NV	SWst	853	667	78.2%
Fort McDowell Mohave-Apache	Fountain Hills, AZ	SWst	824	755	91.6%
Fort Mojave (AZ,CA, NV)	Needles, CA	SWst	813	363	44.6%
Tesque Pueblo	Santa Fe County, NM	SWst	806	355	44.0%
Yavapai Apache	Prescott, AZ	SWst	743	650	87.5%
Fallon Colony+Fallon Resvn	Fallon, NV	SWst	743	639	86.0%
Ak-Chin Maricopa	Maricopa, AZ	SWst	742	652	87.9%
Skokomish Tribe	Shelton, WA	NWst	730	510	69.9%
Te-Moak Tribe of Western Shoshone Indians Nevada (Elko Colony)	Elko, NV	SWst	729	627	86.0%
Port Gamble S'Klallam Tribe	Kingston, WA	NWst	699	505	72.2%
Chehalis	Oakville, WA	NWst	691	388	56.2%
Indian Twp Resvn	Maine	So+East	676	564	83.4%
Bois Forte Band of Chippewa	Nett Lake, MN	GrLks	657	464	70.6%
Pueblo of Zia	Zia Pueblo, NM	SWst	646	645	99.8%
Pleasant Point Resvn	Maine	So+East	640	567	88.6%
Sac & Fox	Tama, IA	So-Cent	616	579	94.0%
Bay Mills	Brimley, MI	GrLks	605	472	78.0%
Nisqually Indian Tribe	Oympia, WA	NWst	588	357	60.7%
Seminole Tribe [Brighton]	Okeechobee, FL	So+East	566	449	79.3%
Penobscot Indian Nation	Old Town, ME	So+East	562	477	84.9%
Tonawanda Band of Seneca	Bason, NY	So+East	543	210	38.7%
Havasupai	Supai, AZ	SWst	503	453	90.1%
Catawba Tribe	Rock Hill, SC	So+East	494	362	73.3%
Santa Ana Pueblo	Sandavol County, NM	SWst	487	473	97.1%
Alabama and Coushatta	Livingston, TX	So-Cent	480	463	96.5%
Ysleta del Sur Pueblo	El Paso, TX	So-Cent	421	300	71.3%
Kickapoo Traditional Tribes of Texas	Eagle Pass, TX	So-Cent	420	406	96.7%
Chitimacha	Charenton, LA	So-Cent	409	285	69.7%
Flandreau Santee Sioux Tribe	Flandreau, SD	NoPlns	408	326	79.9%
Quileute Nation	LaPosh, WA	NWst	371	307	82.7%
Sault Ste Marie Chippewa	Sault Ste. Marie, MI	GrLks	354	290	81.9%
Mashantucket Pequot	Mashantucket, CT	So+East	325	227	69.8%
Dresslerville Colony (Washoe Indians)	Gardnerville, NV	SWst	315	287	91.1%
Ft McDermit Paiute & Shoshone	McDermitt, NV	SWst	309	301	97.4%
Hannahville	Wilson, MI	GrLks	295	253	85.8%
Carson Colony	Carson City, NV	SWst	286	241	84.3%
Paiute Indian Tribe of Utah	Cedar City, UT	SWst	270	250	92.6%
Lower Elwha Klallam Tribe	Port Angeles, WA	NWst	260	208	80.0%
Upper Skagit Indian Tribe	Sedro-Wolley, WA	NWst	238	180	75.6%

Tribe/Reservation	Related Location	Area	Population		
			Total	Native American	Pct Nat. Am.
Sac and Fox (NE, KS)	Reserve, KS	So-Cent	217	49	22.6%
Moapa Band of Paiute	Moapa, NV	SWst	206	165	80.1%
Kalispel	Usk, WA	NWst	206	180	87.4%
Kaibab-Paiute	Fredonia, AZ	SWst	196	131	66.8%
Stewart Colony	Carson City, NV	SWst	196	150	76.5%
Yavapai-Prescott	Prescott, AZ	SWst	182	117	64.3%
Immokalee Reservation	Collier County, FL	So+East	175	142	81.1%
Iowa Tribe of KS & NE	White Cloud, KS	So-Cent	168	99	58.9%
Poarch Creek Indians (AL+FL)	Altmore, AL	So+East	156	98	62.8%
Duckwater Shoshone	Duckwater, NV	SWst	149	116	77.9%
Seminole Tribe [Big Cypress]	Hendry County, FL	So+East	142	110	77.5%
Yerington Paiute	Yerington, NV	SWst	139	124	89.2%
Houlton Maliseet Band (Trust Land)	Houton, ME	So+East	136	111	81.6%
Lac Vieux Desert Band of Lake Superior Chippewa	Watersmeet, MI	GrLks	135	113	83.7%
Ely Indian Colony	Ely, NV	SWst	133	87	65.4%
Tonto Apache	Payson, AZ	SWst	132	115	87.1%
Battle Mountain Band Colony	Battle Mountain, NV	SWst	124	112	90.3%
Las Vegas Paiuate Tribe	Las Vegas, NV	SWst	108	100	92.6%
Confederated Tribes of the Goshute Reservation	Ibapah, UT	SWst	105	97	92.4%
Lovelock Paiute	Lovelock, NV	SWst	103	86	83.5%
Hoh Indian Tribe	Clallam County, WA	NWst	102	81	79.4%
Stillaguamish	Arlingtn, WA	NWst	102	76	74.5%
Yomba Shoshone	Austin, NV	SWst	96	89	92.7%
South Fork Band	Lee, NV	SWst	83	77	92.8%
Kootenai Tribe of Idaho	Bonners Ferry, ID	NWst	75	71	94.7%
Chehalis, Chinook & Quinault (Shoalwater Resvn)	Pacific County, WA	NWst	70	44	62.9%
Winnemucca Indian Colony	Humbolt County, NV	SWst	62	44	71.0%
Narragansett Indian Tribe	Washington County, RI	So+East	60	9	15.0%
Wells Band Council	Wells, NV	SWst	54	39	72.2%
Sauk-Suiattle Indian Tribe	Darrington, WA	NWst	45	35	77.8%
Skull Valley Band of Goshute Indians	Grantsville, UT	SWst	31	30	96.8%
Oneida Indian Nation of NY	Vernon, NY	So+East	26	14	53.8%
Coushatta	Elton, LA	So-Cent	25	20	80.0%
Summit Lake Paiute	Winnemucca, NV	SWst	15	11	73.3%
Huron Potawatomi	Fulton, MI	GrLks	11	9	81.8%
Seneca Nation of Indians (Oil Springs Resvn)	Allegany & Cattaraugus Counties, NY	So+East	11	0	0.0%
Jamestown S'Klallam Tribe	Sequim, WA	NWst	9	0	0.0%
Mohegan Tribe	Uncasville, CT	So+East	2	0	0.0%
Fort Pierce Resvn	St. Lucie Co, FL	So+East	2	0	0.0%
Little River Band of Ottawa Indians	Manistee, MI	GrLks	2	0	0.0%
Miccosukee	Miami, FL	So+East	*		
Tampa Reservation	Hillsborough, FL	So+East	*		
Coconut Creek Resvn	Broward County, FL	So+East	*		
Northwestern Band of Shoshoni Nation	Pocatello, ID	NWst	*		
Little Traverse Bay Band of Odawa	Petoskey, MI	GrLks	*		
San Juan Southern Paiute	Tuba City, AZ	SWst	*		
Seminole Tribe	Broward County, FL	So+East	*		
Georgia Tribe of Eastern Cherokees	Dawsonville, GA	So+East	*		
Mashpee Wampanoag Trust Land	Mashpee, MA	So+East	*		
Matvh-e-be-nash-she-wish Band of Pottawatomi	Dorr, MI	GrLks	*		
Canoncito Navajo Chapter	Canoncito, NM	SWst	*		
Ramah Navajo	Ramah, NM	SWst	*		
Goshute Pauite Tribe of Utah & Nevada	Ibapah, UT	SWst	*		
Monacan Indian Tribe	Monroe, VA	So+East	*		
Nansemond Indian Tribe	Chesapeake, VA	So+East	*		
United Rappahannock Tribe	Indian Neck, VA	So+East	*		
Snoqualmie Tribal Org	Fall City, WA	NWst	*		

* Reservation not listed in Census 2000.

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