TRIBAL TRANSPORTATION AND SAFETY IMPROVEMENT PROJECT: A ROAD TO IMPROVED LIVING

NEEDS ASSESSMENT SURVEY

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GLOSSARY OF ABBREVIATIONS

ADT	Average Daily Traffic
ARTS	Advanced Rural Transportation Systems
BIA	Bureau of Indian Affairs
ITS	Intelligent Transportation Systems
TERO	Tribal Employment Rights Offices
USDOT	U.S. Department of Transportation
VMT	Vehicle-Miles of Travel
WTI	Western Transportation Institute at Montana State University – Bozeman

ABSTRACT

Tribal transportation has come a long way from the days of the dog and horse, and although America is on the brink of the 21st century, tribal transportation remains behind in transportation technologies.

To fully understand the conditions of transportation systems on Indian reservations in the Western Region of the United States, the Western Transportation Institute (WTI) at Montana State University – Bozeman conducted a Tribal Transportation and Safety Needs Survey. The survey was sent to tribal transportation planners on reservations throughout the Western United States. It sought to identify areas of transportation that are working well for tribal members as well as those areas that need improvement. General categories covered in the survey were road improvement systems that are currently being used, funding utilized for transportation improvement, and areas of transportation that tribal transportation planners feel need to be examined.

This report summarizes the results from the survey and explores possible intelligent transportation systems (ITS) that could improve tribal transportation. This survey is the first phase of a larger Tribal Transportation and Safety Improvement Project. The goal of this ongoing project is to identify the transportation areas on reservations that need development or improvement and recommend solutions. It is envisioned that this project will further identify transportation improvements and thereby help increase tourism, create jobs for Indian people, and strengthen tribal sovereignty as it applies to transportation.

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1 INTRODUCTION

Tribal transportation has taken an intriguing course of evolution over the last 500 years. In pre-contact times, Indian people used dogs for transporting their belongings while they walked. This means of travel made long distance travel nearly impossible and restricted the amount of possessions a family could have. In some regions, Indian people used dog sleds, kayaks, and canoes for transportation. The 16th century brought a tremendous change in tribal transportation with the arrival of the horse. The horse permitted tribes to be more mobile, allowing them to travel greater distances, occupy more territory, and, likewise own more possessions (1).

The 20th century, yet again, brought a change in tribal transportation in the form of the automobile. However, unlike traditionally utilized modes of transportation, automobiles were not as easily accessible and brought a variety of transportation problems that had not previously existed.

To fully appreciate the difficulties tribal transportation planners encounter, it is important to get an overview of the governance of Indian reservations. Jurisdiction on tribal lands is complex and confusing. There are federal-state-tribal jurisdictions and public-private partnerships, depending on whether the reservation borders National Parks, military bases, national forests, State land, private property, or international borders (2). This complicates many issues, including which agencies are responsible for maintaining their portion of the roads.

Administratively, transportation services are difficult to maintain and initiate because of social/cultural barriers that exist, vast geographic distances on some tribal lands, and sub-standard roadways and infrastructure of tribal transportation offices. To compound these problems, tribal transportation offices not only have to work with Federal, state, and local regulations and officials, they must also adhere to tribal councils' decisions, the Bureau of Indian Affairs and any other branch of the Federal government that is involved (2). To accomplish all this and maintain tribal sovereignty is, politically, a fine line to walk.

Organized transportation is very important for tribal members. They are dependent on transportation to deliver needed human services, for travel to medical centers and offices, shopping, jobs, and schools. Many tribal members do not own a vehicle and rely on neighbors and friends to transport them to their destinations. Because this mode of transportation is unreliable, many tribal members miss appointments and are late for work. This lack of reliable public transportation is one cause of young men losing jobs and the elderly not receiving medical attention they often desperately need (2).

All these factors reflect the social and economic levels of Indian reservations in America. Many, if not all, Indian reservations have similar economic conditions as third world countries and are among the most impoverished communities in America. Improving transportation infrastructure on reservations might possibly generate significant and measurable social and economic growth (2).

In order to help define and clarify modern tribal transportation problems, the Western Transportation Institute (WTI) at Montana State University-Bozeman developed a Tribal Transportation and Safety Needs survey that was sent to tribal transportation planners in the

western region of the United States. The survey provided an opportunity for transportation planners to describe what transportation problems exists on their reservation.

The needs assessment survey permitted tribal transportation planners to describe their transportation problems. It likewise provided appropriate information to determine similarities of transportation problems among the reservations. In the process of analyzing survey results, possible intelligent transportation systems (ITS) applications were examined that would potentially improve transportation within Indian reservations, specifically those applications that could improve tourism and help increase revenue and independence for tribal communities. From there, other tribal transportation needs could be more easily met.

The survey represents the first phase in a larger project, the goals of which are to identify existing transportation problems on Indian reservations and ascertain whether each reservation has individual needs or if there are common needs among all the reservations in the western region of the United States. The ultimate goal is to develop working relationships with tribes with the hope that with the appropriate funds, field operational tests may be deployed on selected reservations.

2 LITERATURE REVIEW

Before starting the Tribal Transportation Project, a literature review was conducted to determine if any research had been conducted in this area. It was hoped that this could help to establish what direction to pursue in this research, hopefully covering new territory and providing new findings. Likewise, the literature review would provide a solid foundation of what has already been accomplished in this area, and what mistakes and benefits there have been.

A preliminary search for studies examining tribal transportation needs revealed few applicable materials. One source was a study done by the Mountain–Plains Consortium on "Assessing Transportation Needs on Indian Reservations," completed in 1993 (3). This study concentrated on reservations in Minnesota, North Dakota, Wyoming, Colorado, and Utah that were considered to be the most isolated by the Consortium. Six reservations participated in the study. The research team distributed the survey door-to-door and the questions concentrated on what members of the tribal community felt were the crisis issues in transportation. Researchers were most interested in seeing who owned automobiles and who took buses or other forms of transportation, and what one infrastructure feature needed the most improvement. The study found that transportation management was the number one need on Indian reservations. The researchers stated that management is necessary for any transportation system to be effective and consequently, the problems found on the reservations in the study, were a result of poor management (3).

While a valuable effort, this Mountain-Plains Consortium study concentrated on the views of the general public. For this current research effort, it was felt that a better overall perspective of transportation needs might be obtained through tribal transportation planners. Moreover, doing a large-scale door-to-door survey of all reservations in the western United States would be cost-prohibitive.

Other information sources found were primarily reports of conferences or reports by private consultants on field operation tests of Advanced Rural Transportation Systems (ARTS) and ITS on reservations. These reports helped to identify areas that appeared to be the most critical and consequently were able to design the survey questions around those areas.

3 SURVEY METHODOLOGY

A survey was deemed to be the best method of conducting a first-level assessment of the transportation needs of reservations. This section reviews the methodology used in developing and using the survey instrument, which is included as Appendix A.

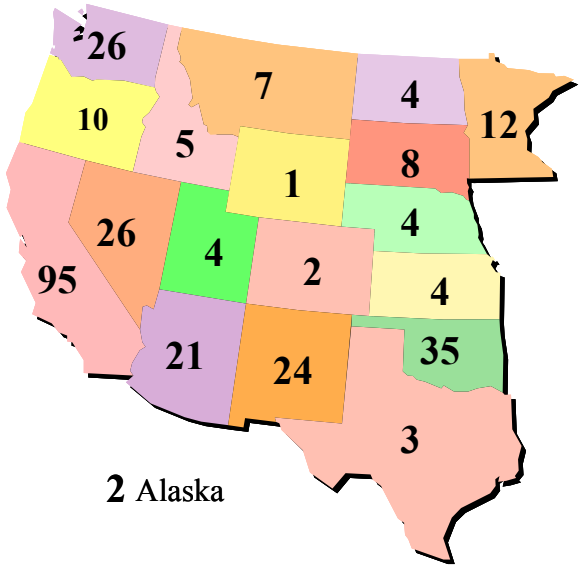

Figure 1: Distribution of Surveys by State.

3.1 Survey Design

The literature review revealed a lack of precedent in conducting surveys of tribal transportation planners. Therefore, the survey was designed to address many of the issues that were mentioned in the literature and anecdotally as affecting reservations. These issues include economic development, alcohol and safety, lack of transportation funding, and deficient training for transportation. The survey was designed to be open-ended enough to allow reservations to specify what sorts of challenges they face and what opportunities they perceive.

The survey form also included space for the respondent to indicate which reservation they were representing, and what they background is in their current job position. Knowledge of the reservation for each completed survey would allow for analysis between reservation statistics, such as economic health, and the planner's respondents.

3.2 Survey Distribution

The Tribal Transportation Needs Assessment survey was mailed to 293 tribal planners throughout 19 states in the western United States, as shown in Figure 1. The database utilized for the mailing did not have names of specific people to whom the survey should be sent (4); therefore, the survey was sent to the general title "Transportation Planner" in care of the main tribal office.

Recipients were given a business reply mail envelope to send their responses back. They were also invited to fax responses. The initial deadline given for the survey was subsequently extended to improve response rate.

4 SURVEY RESULTS

Excluding reservations that expressed the desire to be dropped from this research effort, 107 tribal planners completed the survey form for a response rate of 41 percent[1]. Of the surveys that were returned, there were three recurring themes that emerged from survey results: economics, isolation, and safety. This section will describe some of the major findings gathered in the survey, and will try to provide context that would help to explain particular patterns in the results.

4.1 Socioeconomic Characteristics

In order to provide a context for survey responses, it is critical to have an understanding of the socioeconomic characteristics of the reservations that respondents were representing in their responses, as well as the experience and background of the respondents.

In looking at information about the individual respondents, it was discovered that many of the reservations evidently lack a formal tribal transportation planner. Of the 107 respondents, only 14 percent specified having a title relating exclusively to transportation, whereas 4 percent held combined positions. The remaining 82 percent held other positions and were on-call to assist on transportation issues. This is shown in Figure 2. The lack of tribal transportation personnel may partially account for the remaining 59 percent of the surveys not being returned.

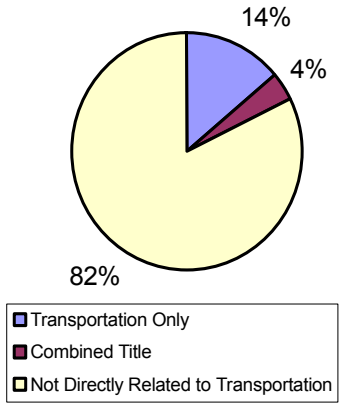

Figure 2: Job Titles of Survey Respondents.

Table 1 shows the distribution of the years of experience respondents had at their current job title. The majority of respondents indicated having at least one year of experience in their current title. However, it should be noted that more than half of the respondents whose job titles are exclusively related to transportation have five years or less experience in their current

Experience / Title	3-6 months	6-12 months	1-5 years	More than 5 years	No Response	Total
Transportation Only	1	4	3	6	1	15
Combined Title	0	0	2	2	0	4
Not Directly Related to Transportation	8	11	43	24	2	88
Total	9	15	48	32	3	

Table 1: Years of Experience at Current Job Title.

[1] Please note that although 293 surveys were sent out at the beginning of the project, many reservations responded to the survey only to ask to be excluded from the study. Therefore, the 41 percent response rate is based on 261 reservations that have chosen to remain in the study.

positions.

As was alluded to in the introduction, there may be many differences across reservations, based on political, economic and legal relationships. These relationships may have a significant impact not only on what problems a reservation has, but also what solutions may be available to them.

Respondents were asked to identify the reservation on behalf of which they were responding. Table 2 lists the number of respondents by the state where the survey was mailed to, along with the number of surveys sent to reservations in each state. The table shows that at least one response was gathered from each of the states to which surveys were mailed. Having such a good geographic cross-section of reservations across the western United States should enable the survey results to accurately reflect the issues that tribes are concerned with.

State	Surveys		Response Rate
	Sent*	Responses	
Alaska	2	2	100%
Wyoming	1	1	100%
Idaho	5	4	80%
Montana	7	5	71%
Texas	3	2	67%
Kansas	4	2	50%
Colorado	2	1	50%
Arizona	21	10	48%
Washington	26	12	46%
Oklahoma	35	15	43%
South Dakota	8	3	38%
New Mexico	24	8	33%
Minnesota	12	4	33%
Oregon	10	3	30%
California	95	27	28%
Utah	4	1	25%
Nebraska	4	1	25%
North Dakota	4	1	25%
Nevada	26	5	19%
Total	293	107	37%

* - Includes reservations which asked to be dropped from the research project.

Table 2: Response Rate by State.

A similar way of distinguishing reservations is to divide them according to Bureau of Indian Affairs (BIA) region. These boundaries, developed primarily for administrative purposes, do not intersect any reservation boundary, as shown in Figure 3. As reservations interact directly primarily with their respective BIA region, it may be that reservations under one BIA region may face different circumstances than those under another region. Table 3 indicates the response rates for each of the BIA regions for which surveys were mailed in this survey. In the Midwest Region, surveys were only sent to reservations in the state of Minnesota.

BIA Region		Number of Reservations		
Region Name	Regional Office	Surveyed	Responses	Percent
Alaska	Juneau	2	2	100%
Eastern Oklahoma	Muskogee	35	14	40%
Great Plains	Aberdeen	16	5	31%
Midwest	Minneapolis	12	4	33%
Northwest	Portland	41	19	46%
Pacific	Sacramento	95	27	28%
Rocky Mountain	Billings	8	5	63%
Southern Plains	Anadarko	7	4	57%
Southwest	Albuquerque	26	10	38%
Western	Phoenix	51	17	33%
All Regions		293	107	37%

Table 3: Response Rate by BIA Region.

Another way of describing reservations is to look at economic statistics such as per-capita income and unemployment. Table 4 shows how per-capita income compares among reservations (4) responding to this survey against the nineteen Western states covered in this study, and against national statistics (5). The table, using 1990 data – the most recent data available for

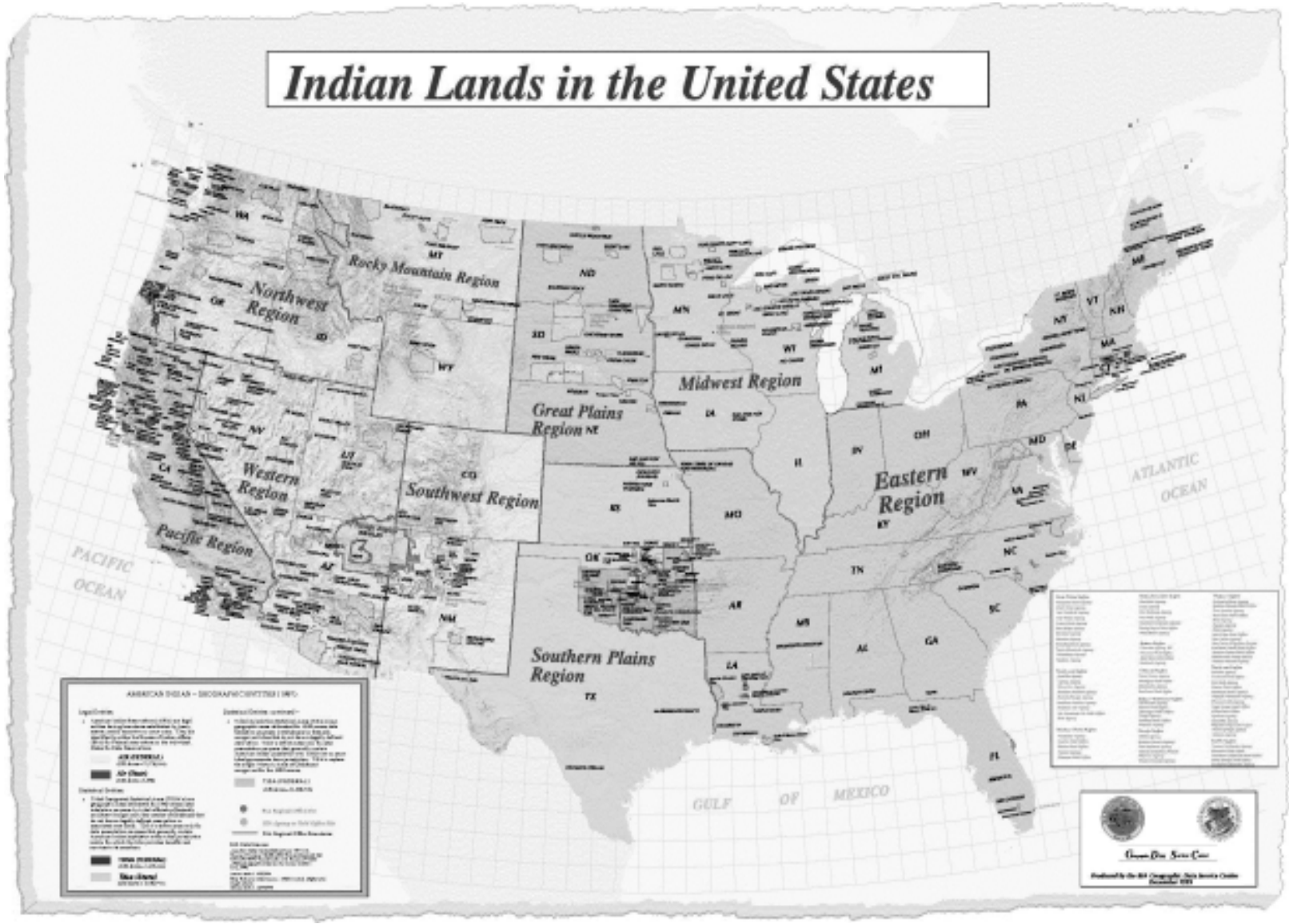

Figure 3: Map of BIA Regions. (Source: 6)

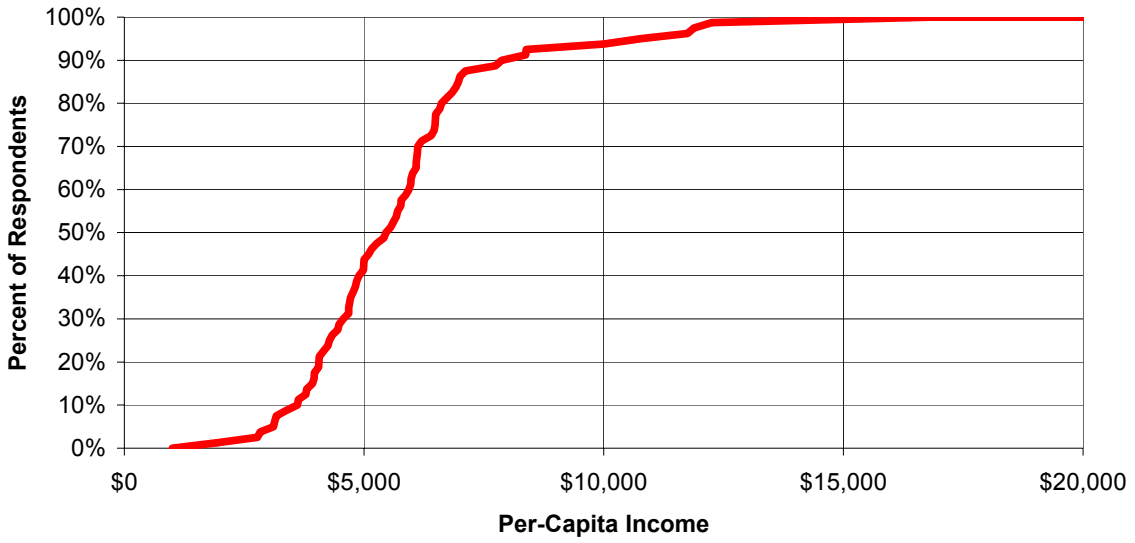

Figure 4: Cumulative Distribution of Per-Capita Income Among Respondents.

individual reservations – shows that reservations on average have a significantly lower per-capita income than those of Western states and the United States as a whole[2].

	Respondent Reservations*	Western States*	National*
Low	$1,939	$14,960	
High	$16,800	$22,719	
Median	$5,507	$17,996	$19,584

Source: (6) for state and national statistics;
(7) for reservation statistics

* - 1990 data

Table 4: Per-Capita Income Comparison.

A more compelling picture of this is perhaps shown in Figure 4. This figure shows the percentage of responding tribes with a 1990 per-capita income less than a given threshold. Only six percent of responding reservations had a 1990 per capita income in excess of $10,000, which is still only half of the national per-capita income. Nearly 90 percent of those tribes who responded to this survey had per-capita incomes of less than $7,500.

These socio-economic comparisons indicate that incomes are lower on those reservations that responded to this survey than in their respective states, and in the nation as a whole. In fact, data from reservations that have estimates of per-capita income show that in no case did a reservation have a per-capita income that exceeded its state's per-capita income.

[2] Data on these areas were five to ten years out dated, with nothing available being more recent than five years old. However, even with the five-year discrepancy, the numbers had not varied much, indicating conditions had not changed.
Since 1990, many reservations have started casinos on their lands. Tribally-run casinos often times will provide dividend payments to tribal members which may be several times higher than their per-capita income through employment.

It may be asked whether the income disparity is simply because reservations have lower paying jobs. To assess this, unemployment rates for responding tribes were compared with state and national rates from comparable years. Again, 1990 was the most recent year for which data at the reservation level was available. As Table 5 shows, unemployment on reservations is significantly higher than it is for their respective states and for the United States overall. Anecdotally, many tribes have unemployment rates in excess of 70 percent (5), although this was true for only one respondent to the survey. In examining the 73 tribes for which unemployment data was available, only two reservations reported unemployment rates lower than their state's rate.

	Respondent Reservations*	Western States*	National*
Low	3.4%	2.2%	
High	76.9%	7.1%	
Median	27.0%	5.5%	5.6%

Source: (6) for state and national statistics; (7) for reservation statistics

* - 1990 data

Table 5: Comparison of Unemployment Rates.

Another critical factor in examining tribal transportation is their relative isolation. One proxy measure for isolation may be population density, as those areas with lesser population density likely have greater distances between people and services. Table 6 shows the population density of reservations based on their geographic area. It is interesting to note that the majority of survey responses were received from reservations covering fewer than 50 square miles in area. Population densities on these reservations are, on average, greater than both the national population density of 70.3 persons per square mile as well their respective state's population density. This makes sense in that these smaller reservations are typically located in more urbanized areas.

Size	Total Population of Responding Tribes*	Percentage
Very Small	62,194	9.8%
Small	28,315	4.5%
Medium	85,258	13.5%
Large	221,264	35.0%
Very Large	234,786	37.2%
Total	631,817	100.0%

* - Includes only reservations for which land area estimates were available.

Table 7: Distribution of Reservation Population by Reservation Size.

While reservations that responded to this survey have, on average, a higher population density than the remainder of their respective states, the majority of reservation residents live on lower-density reservations. This is shown by Table 7, which sums 1990 population estimates for each of the geographic categories defined in Table 6. While more than 60 percent of responding

			Population Density (per square mile)			Relationship to State Pop. Density	
Size	Area (sq. mi.)	Count*	Low	High	Mean	Greater	Lesser
Very Small	< 5	39	17.6	182,978.1	7,847.7	37	2
Small	5 - 50	20	6.8	492.6	93.4	11	9
Medium	50 - 500	20	0.6	142.3	25.4	9	11
Large	500 - 5,000	19	1.6	30.0	6.9	3	16
Very Large	> 5,000	1	8.8	8.8	8.8	0	1

* - Land area estimates were not available for all reservations.

Table 6: Comparison of Population Density.

reservations were less than 50 square miles in area, these respondents accounted for only about 14 percent of the population of reservations responding.

In summary, this survey's responses represent a geographically diverse sample of reservations in the western United States. While the survey was targeted to transportation planners, the job title for most respondents often did not refer at all to transportation. Reservations responding to this survey were economically worse off than non-reservation lands in terms of both unemployment and per-capita income, and often have lower population densities than the states where they are located.

4.2 Major Challenges

One central goal of the Tribal Transportation and Safety Needs Survey was to establish what challenges related to transportation are currently experienced by reservations. Respondents were asked what was the single most important challenge faced by reservation communities, and they overwhelmingly cited "economic development" as the greatest challenge, as shown in Figure 5. More than two-thirds of respondents cited this as the top challenge. Given the statistics characteristic of survey respondents as described in the previous section, this is not surprising.

It was anticipated that respondents whose job title includes transportation would be more likely to consider a transportation-related issue as the top challenge facing their reservation. As is shown in Table 8, however, the opposite is true.

In examining the relationships between this response and each reservation's socioeconomic data, one striking finding is that reservations tend to perceive economic development as an equally relevant challenge, regardless of the reservation's unemployment rate or per-capita income. Tables 9 and 10 shows how the top challenge identified by respondents is distributed according to the reservation's 1990 unemployment and per-capita income, respectively. These tables show that a comparable percentage of respondents in each economic level considered economic development to be the top challenge facing their reservation, even for reservations with better-than-average unemployment and income levels.

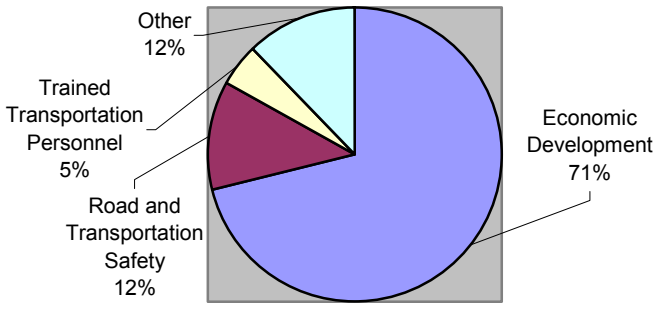

Figure 5: Most Important Challenge.

Job Title	Top Challenge: Economic Development	Road and Transportation Safety	Trained Transportation Personnel	Other	% Directly Related to Transportation	Total
Transportation Only	12	1	0	2	7%	15
Combined Title	1	2	1	0	75%	4
Not Directly Related to Transportation	63	10	4	11	16%	88
Total	76	13	5	13	17%	107

Table 8: Top Challenge Facing Reservations by Respondent's Job Title.

The top challenge as identified by respondents was analyzed against other reservation characteristics, including state, BIA region, reservation size, population density, level of Federal funding for transportation, and vehicle-miles of travel. In general, little correlation was shown between any of these factors and the top challenge. This indicates that economic development seemed to be a dominant concern of reservations, controlling for many different factors. Moreover, at least one respondent from all nineteen states indicated economic development to be the top challenge facing their reservation.

Unemployment*	Top Challenge: Economic Development	Road and Transportation Safety	Trained Transportation Personnel	Other	Total
Less than 10%	3	0	1	1	5
Between 10% and 20%	11	3	1	2	17
Between 20% and 30%	14	5	0	3	22
Between 30% and 40%	11	2	2	3	18
Over 40%	9	0	0	3	12
Total	48	10	4	12	

* - Includes reservations for which unemployment data is available.

Table 9: Top Challenge Facing Reservations by Level of Unemployment.

To better understand why economic development was the top concern for so many tribes, research was done into what the main sources of economic development are for each of the responding tribes. Overwhelmingly, the majority of respondents who listed economic development as the number one concern had agriculture and stock raising as their main sources of income. Tribes that have gaming (e.g. casinos) as their main economic development source or who have turned to gaming in recent years have lower unemployment rates and higher per capita income (4).

Income Level*	Top Challenge: Economic Development	Road and Transportation Safety	Trained Transportation Personnel	Other	Total
Less than $4,000	8	2	2	2	14
Between $4,000 and $6,000	22	8	1	5	36
Between $6,000 and $10,000	18	3	1	3	25
Over $10,000	4	0	0	2	6
Total	52	13	4	12	

* - Includes reservations for which income data is available.

Table 10: Top Challenge Facing Reservations by Per-Capita Income.

Respondents were next asked to rank what they perceived to be the top three transportation challenges in their reservation community. Respondents were asked to select and rank the top three challenges from among seven listed on the questionnaire. Responses were then weighted,

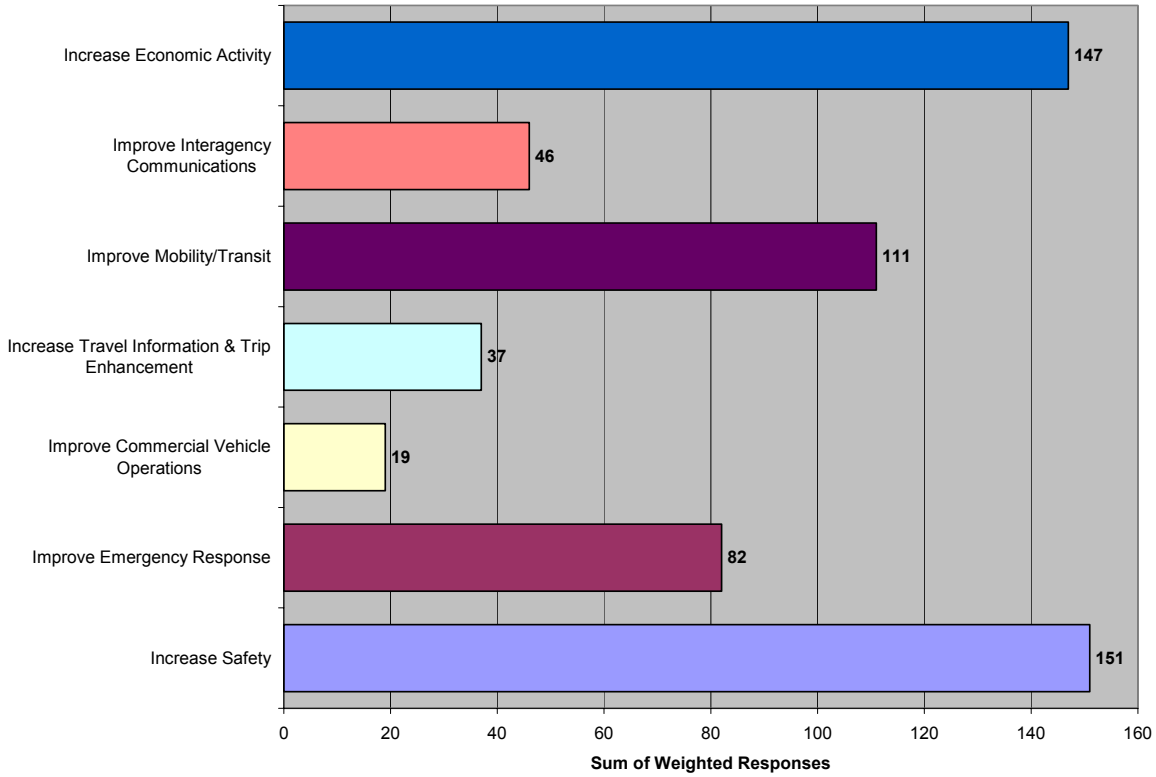

Figure 6: Top Three Transportation Challenges.

with a weight of three being assigned to the top challenge, two for the second challenge, and one for the third challenge. These weighted responses were then summed over all respondents. As can be seen in Figure 6, increasing safety, increasing economic activity and improving mobility/transit were ranked as the top three transportation challenges by survey respondents. In contrast to the results of the first question, economics ranked number two with safety ranked as the top challenge. This likely reflects this question's emphasis on challenges specifically related to transportation.

As Table 11 indicates, the top two challenges identified by respondents were the same independent of whether or not the respondent's job title included transportation. Respondents whose job titles did not refer to transportation at all ranked increasing economic activity as the most significant transportation challenge, followed by safety. The order was reversed for

Transportation Challenge		Is Job Title Exclusively Focused on Transportation?		
	Overall	Yes	Combined	No
1	Safety	Safety	Safety	Economic Activity
2	Economic Activity	Economic Activity	Economic Activity	Safety
3	Mobility/Transit	Mobility/Transit	Mobility/Transit	Emergency Response

Table 11: Top Transportation Challenges by Respondent's Job Title.

Transportation Challenge		Top Overall Challenge			
	Overall	Economic Development	Other	Road and Transportation Safety	Trained Transportation Personnel
1	Safety	Economic Activity	Mobility/Transit	Safety	Safety
2	Economic Activity	Safety	Economic Activity	Emergency Response	Mobility/Transit
3	Mobility/Transit	Mobility/Transit	Safety	Economic Activity	Economic Activity

Table 12: Correlation Between Top Overall Challenge and Top Transportation Challenges.

Transportation Challenge		Selected States				
	Overall	Arizona	California	New Mexico	Oklahoma	Washington
1	Safety	Safety	Economic Activity	Emergency Response	Economic Activity	Economic Activity
2	Economic Activity	Mobility/Transit	Mobility/Transit	Safety	Mobility/Transit	Safety
3	Mobility/Transit	Economic Activity	Safety	Economic Activity	Safety	Mobility/Transit

Table 13: Top Transportation Challenges for Respondents in Selected States.

respondents whose job titles reflected partial or exclusive involvement in transportation.

As might be expected, those reservations that considered economic development to be their most significant challenge indicated that increasing economic activity was their top transportation challenge. Moreover, those reservations that considered road and transportation safety to be their most significant challenge considered improving safety on their reservations to be their most significant transportation need. Both of these are shown in Table 12.

The rankings of transportation challenges across different reservations did not change substantially when controlling for income, unemployment level, vehicle-miles of travel, size, and level of Federal transportation funding. Table 13 summarizes the ranking of transportation challenges as designated by weighted responses for reservations in the five states with the most surveys returned. Safety, economic activity and mobility and transit consistently ranked among the top priorities in individual states as well, although their order in ranking differs slightly.

The results show that safety is a significant concern in almost every Indian community. The survey results indicate that tribal transportation planners are concerned both with incident prevention and emergency response. One of the most prominent concerns on reservations today is the number of automobile incident fatalities that occur from alcohol consumption (8). As shown in Figure 7, 65 percent of respondents felt alcohol played a significant role in the vehicle crash fatalities. Alcohol abuse is a problem for many Indian communities. Anecdotally, many tribal planners that were interviewed by telephone indicated that their communities were aware of the problem and had either developed preventative education programs on alcohol abuse or were in the planning stages of doing so.

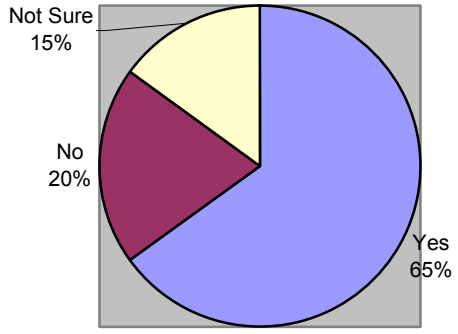

Figure 7: Does Alcohol Play a Significant Role in Vehicle Crash Fatalities?

While alcohol-related crashes were a great concern, emergency response to accidents also needs improvement, according to survey

respondents. Besides impaired drivers, other factors that could contribute to car crashes and safety are the vast distances on reservations. Because Indian communities are often isolated from major cities or even other reservation communities, they have to travel many miles to reach their destination.

The second ranked challenge in Figure 6 was increasing economic activity. Tribal transportation planners evidently perceive a clear linkage between economics and transportation. This relationship works in perhaps two directions: increased economic activity would provide tribes with additional funding to improve their transportation systems, and improved access and mobility to reservations may increase economic opportunity by providing access to off-reservation employment for reservation residents and by promoting tourism. The third ranked challenge, improving mobility and transit, may be closely related to increased economic activity as well.

Improving emergency response, which is closely related to safety, was ranked fourth among the toll challenges, according to Figure 6. The significant distances on reservations, especially in relationship to emergency medical facilities, is certainly a critical factor in poor emergency response.

4.3 Intelligent Transportation Systems

Intelligent transportation systems are one tool that may be used to help too address transportation problems, although they are not the cure-all for transportation problems. Respondents were asked if they had ever heard of ITS. As Figure 8 shows, an overwhelming 81 percent of respondents said they had never heard of ITS. The high percentage of planners who had never heard of ITS technologies is not that surprising.

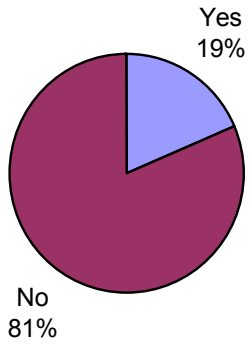

Figure 8: Familiarity of Respondents with ITS.

As was mentioned earlier, many reservations do not have a designated transportation planner. As Table 14 shows, those respondents with job titles including transportation were more likely to be aware of ITS than those whose titles did not. If ITS information were passed down through bureaucratic lines, it is questionable in whose inbox it would reside. Other possible reasons planners are not aware of these technologies is lack of funds in their budgets and lack of training or exposure to any transportation technologies.

	Familiar w/ ITS?		
Job Title	Yes	No	% Yes
Transportation Only	6	9	40%
Combined Title	1	3	25%
Not Directly Related to Transportation	13	75	15%
Total	20	87	19%

Table 14: Familiarity of Respondents with ITS by Respondent's Job Title.

To date, the Federal government has served to provide significant funding for ITS initiatives across the country. Accordingly, it would seem logical that those reservations receiving the most

Federal funding for transportation would be more familiar with different Federal programs, such as ITS. Survey responses confirm this, as Table 15 shows that the familiarity of reservations with ITS increases with Federal funding of transportation.

Funding		Familiar w/ ITS? Yes	No	% Yes
Nominal	< $1K per year	0	18	0%
Minimal	$1K - 10K per year	1	11	8%
Moderate	$10K - 100K per year	7	17	29%
Significant	$100K - 1M per year	4	28	13%
Strong	$1M - 10M per year	7	13	35%
Very Strong	> $10M per year	1	0	100%
Total		20	87	19%

Table 15: Familiarity with ITS by Federal Funding Level.

The lack of knowledge about ITS is likely to the detriment of the tribes, as ITS applications may potentially help to address the top three transportation challenges indicated by the survey results: safety, economic improvement, and isolation.

There are many rural ITS applications that deal with improving safety[3]. Emergency Services ITS applications would unquestionably improve response time to accidents (7). However, these should not be pursued independently of community education on alcohol abuse and its effects.

While ITS applications do not directly assist reservations in obtaining additional funding for transportation, there are some applications that can help tribal communities improve their economic growth and create a financial base to help complete road projects and transportation improvements and help tribes exercise and strengthen their sovereignty.

- Traveler Safety and Security, Tourism and Travel Information Services, and Infrastructure Operations and Maintenance are some areas of ITS applications that could help to increase revenue for tribal communities. By improving security and information for travelers, a tribal community not only ensures travelers of safe road conditions but also encourages them to travel to "Indian Country" for vacations. Tourism brings needed economic vitality to reservation communities (7).

- Infrastructure Operations and Maintenance ITS applications could help to assure both residents and travelers on the reservation that those rural roadways will be maintained and passable through all weather conditions. When these rural roads are well maintained, tribal residents are able to commute to necessary jobs and services (7).

- ITS applications related to Public Traveler Services/Public Mobility Services may also improve travel conditions for isolated tribal members. Improving transit systems through ITS applications could help to provide transportation for citizens who otherwise may not have a means of transportation. Likewise, a transit system would provide another avenue of transportation that members could utilize when commuting to and from jobs. It is important to understand that Public Traveler Services/Public Mobility Services ITS applications can help improve the efficiency of para-transit

[3] See (7) for further description of these ITS application groups.

services so they may become more economically feasible in reservations where there is a lower population density (7).

On some reservations in the western United States, isolation makes it difficult for tribal members to travel to necessary services like grocery stores and medical facilities, as well as to their workplace. Lack of transportation for many tribal members can account in part for the high unemployment rates, as people have no reliable transportation that can get them to their place of employment.

Tribal planners were asked which types of ITS applications they felt would be useful to their existing transportation system. For each type of application, examples were cited in order to provide some context for respondents who had not heard of ITS prior to this survey. There were thirty usable responses to this question. These responses were weighted in the same manner that the responses to the question about the top transportation challenges were. As is shown in Figure 9, ITS applications in five of the seven ITS program areas were ranked fairly close together as among preferred applications. Emergency Services applications, which could help to improve safety, received the highest weighted response, with Infrastructure Operations and Maintenance, Traveler Safety and Security, Tourism and Travel Information Services and Public Traveler Services/Public Mobility Services all closely behind. Because of the relatively small number of responses, conclusions about the relative importance of each of these should be tentative. The

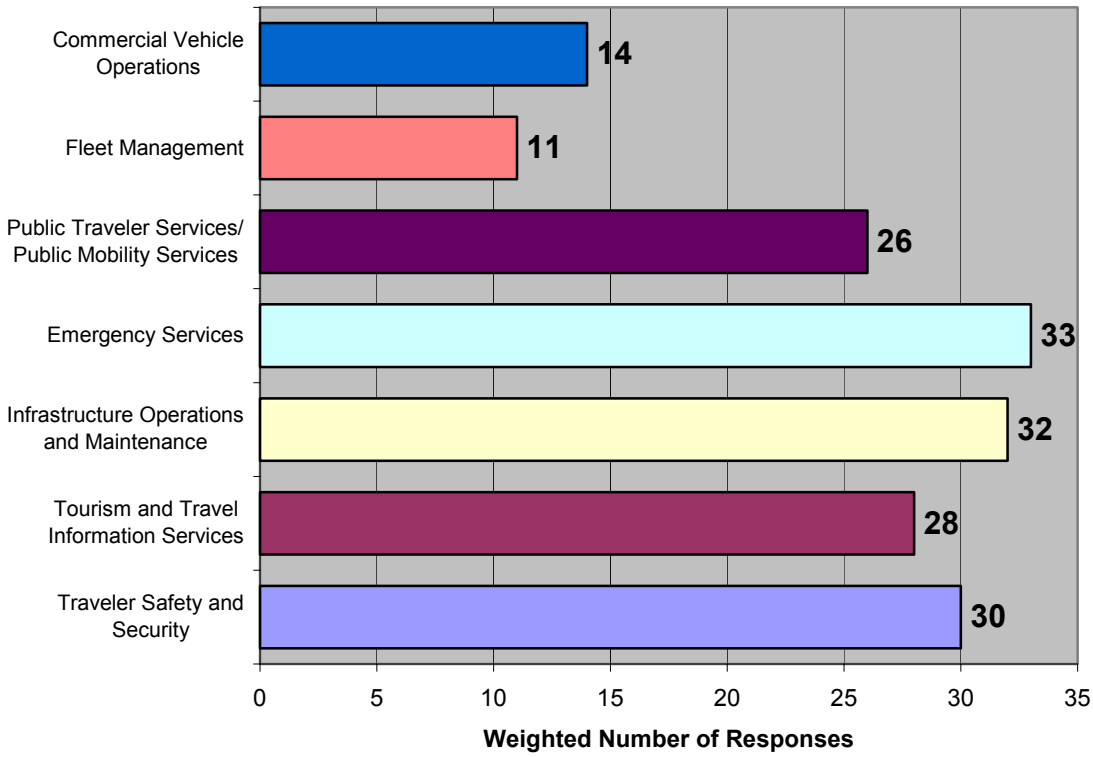

Figure 9: Desired ITS Technologies.

fact that several program areas ended up being ranked fairly closely together suggests that ITS applications for reservations will likely not have a one-size-fits-all solution, even though many reservations share similar economic and geographic problems.

4.4 Transportation Funding

Although many tribal transportation planners expressed interest in ITS applications, they indicated that Federal and State support for their transportation programs is currently inadequate, even without considering ITS. As shown in Figure 10, 79 percent of survey respondents stated that they do not receive sufficient support from Federal and State governments, while only 9 percent said they did. Without support from Federal and State governments, reservations often find it difficult to complete any road project, let alone implement ITS solutions.

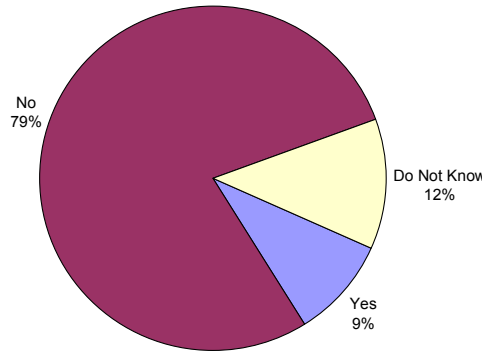

Figure 10: Adequacy of Federal and State Support for Transportation Improvements.

As in other areas, economics are likewise a problem for transportation, as Tribal Governments expressed that they have difficulties obtaining funds from Federal and State agencies. In conversations with several tribal transportation planners, they indicated that relationships between tribes and the BIA, State agencies, and Federal agencies are often adversarial, although there are a few exceptions. Because of the lack of funding there are a substantial number of incomplete road projects. One transportation planner illustrated how limited the funds are.

> "The funding I receive for FY 2000 is $946. The BIA funds my program out of Aberdeen, S.D. With the amount of roads that have been in disrepair for years, this is not enough to keep the office open for 6 months. Construction Budget is only $400,000. Our next project is $800,000 for FY 2000."

Tribal transportation highway funds are distributed through a relative need formula developed by the Bureau of Indian Affairs and the Federal government. The relative need formula originated through the 1982 Surface Transportation Assistance Act, which provided Highway Trust Funds for road construction on Indian reservations in the United States. In order to determine how funds would be distributed to individual reservations, BIA started designing a process to determine the relative need for each reservation. After a comprehensive study and investigation that took nine years, BIA developed the Relative Need Formula and submitted it to the Deputy Commissioner of Indian Affairs for approval in 1992. The Deputy Commissioner of Indian Affairs approved the formula in January 1993 (9). It was subsequently revised four times before the final version was established in 1996.

The formula emerged as the shown in Figure 11. The Relative Need Formula attempts to distribute much needed road construction funds fairly among the tribes, by considering the amount of travel occurring on the reservation, the population of a reservation, and the estimated

$$A_i = 0.50 \times \frac{CI_i}{\sum_i CI_i} + 0.30 \times \frac{VMT_i}{\sum_i VMT_i} + 0.20 \times \frac{POP_i}{\sum_i POP_i}$$

where A_i = percent relative need for tribe *i*
CI_i = total cost-to-improve for tribe *i*
VMT_i = total vehicle-miles of travel for tribe *i*
POP_i = total population for tribe *i*

(Source: 9)

Figure 11: Relative Need Formula.

cost of improving the reservation's roads. According to some tribal planners, there are flaws in the formula that put many smaller tribes at a disadvantage. Estimates for vehicle-miles of travel (VMT) come from the road inventory database that the BIA and the tribe have compiled. Existing VMT databases are often deficient, however, because many tribally owned dirt roads or minor secondary roads are often eliminated from the database, mainly because of the low average daily traffic (ADT) volumes. For many reservations, however, this by no means indicates the road's lack of importance to members of the community. Hence, these less traveled roads are not part of the calculation and no money is allocated for their improvement or maintenance (9). In addition to this, the problem of overlapping jurisdictions can exacerbate calculating an accurate VMT estimate.

Population data, likewise, is questionable. Population estimates for each reservation are usually self-reported. Some tribal governments are adamant about keeping their records on population accurate, while others may not find it as important. Hence tribes that report inaccurate numbers or tribes that have a fairly small population are at a disadvantage. For instance, several rancherias in California have populations under 100 people. Accordingly, their allocated Federal road construction funds ranged from $39 to $68 for the entire year (10). Needless to say, this does not leave much money to do much of anything and consequently their roads remain in poor condition.

The current funding formula tends to direct larger sums of money toward more rural tribes and tribes with larger land areas, as shown in Tables 16 and 17. It should be emphasized that the labels used in the table for funding labels – such as "Very Strong Funding" – are terms to

		Funding Category (annual funding)						
Density (Per Sq. Mi.)		Nominal (< $1K)	Minimal ($1K - 10K)	Moderate ($10K - 100K)	Significant ($100K - 1M)	Strong ($1M - 10M)	Very Strong (> $10M)	Total
Very Rural	Less than 10	1			8	15	1	25
Rural	Between 10 and 25	1		3	6	3		13
Small Urban	Between 25 and 100		6	3	9	1		19
Urban	Between 100 and 1,000	7	2	9	4	1		23
Very Urban	Greater than 1,000	6	3	6	4			19
Total*		15	11	21	31	20	1	

* - Includes reservations for which land area estimates are available.

Table 16: Federal Transportation Funding by Population Density.

Size (sq. mi.)		Funding Category (annual funding) Nominal (< $1K)	Minimal ($1K - 10K)	Moderate ($10K - 100K)	Significant ($100K - 1M)	Strong ($1M - 10M)	Very Strong (> $10M)	Total
Very Small	Less than 5	14	7	13	5			39
Small	Between 5 and 50	1	4	6	9			20
Medium	Between 50 and 500			2	14	4		20
Large	Between 500 and 5,000				3	16		19
Very Large	Greater than 5,000						1	1
Total*		15	11	21	31	20	1	

* - Includes reservations for which land area estimates are available.

Table 17: Federal Transportation Funding by Reservation Size.

characterize funding levels with respect to other tribes, as opposed to the ability of the funding level to meet tribal needs.

Funding for road construction and maintenance remains an important issue for tribal transportation planners. A subcommittee of the BIA, which is under the U.S. Department of Interior, and the Indian Reservation Roads program, which is a part of the Federal Highway Administration's Federal Lands Highway Program, is currently examining the Relative Need Formula, to determine whether it is possible to allocate more funds to tribes. A revised formula may help to provide the funding necessary to improve the long-term standard of all reservation roads.

4.5 Road Projects on Tribal Lands

The statistics cited earlier indicate that jobs in Indian communities are frequently difficult to find. Construction projects on reservations, including road projects, are one avenue of employment for Native Americans. However, employers often overlook Native American applicants and hire non-Indians from surrounding communities. Respondents were asked whether tribal members in their reservation were given hiring priority for road construction projects. As Figure 12 shows, half of respondents indicated that tribal members are not given hiring priority on these projects. About one-third of the respondents said that tribal members were given some sort of priority. Interestingly, 16 percent of respondents – those who are likely the most familiar with the funding of the transportation system on their reservation – did not know whether hiring priority was given.

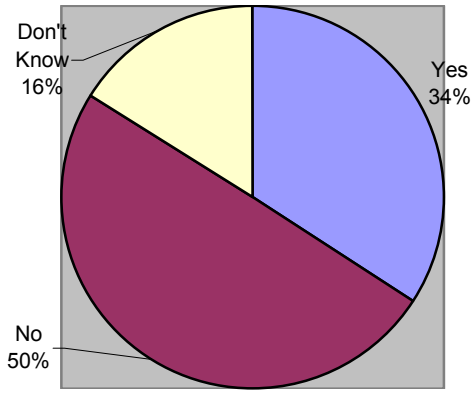

Figure 12: Is Hiring Priority Given to Tribal Members on Road Construction Projects?

One potential explanation of this is that road construction budgets on many reservations may be so limited that road construction projects are an infrequent occurrence. This, combined with the lack of experience of respondents, may mean that there are not a lot of road construction

Funding		Hiring Priority for Tribal Members? Yes	No	Don't Know	% Yes*
Nominal	< $1K per year	3	9	5	25%
Minimal	$1K - 10K per year	1	8	3	11%
Moderate	$10K - 100K per year	6	14	4	30%
Significant	$100K - 1M per year	11	15	5	42%
Strong	$1M - 10M per year	14	6	0	70%
Very Strong	> $10M per year	1	0	0	100%
Total		36	52	17	

* The percent of yes or no responses that were yes responses.

Table 18: Hiring Priority for Tribal Members by Federal Funding Level.

projects that respondents may use to evaluate this question. Table 18 explores this relationship between the Federal transportation funding level and whether or not the respondent perceived that tribal members are given hiring priority for road construction projects. As can be seen, reservations with higher Federal funding levels – and therefore larger road construction programs – were more likely to offer hiring priority for tribal members than those with smaller levels.

Unemployment*	Hiring Priority for Tribal Members? Yes	No	Don't Know	% Yes*
Less than 10%	2	2	1	50%
Between 10% and 20%	8	6	3	57%
Between 20% and 30%	6	8	7	43%
Between 30% and 40%	9	8	1	53%
Over 40%	2	7	3	22%
Total	27	31	15	

* - Includes reservations with unemployment estimates.

Table 19: Hiring Priority for Tribal Members by Unemployment Level.

Is there a connection between whether a tribe gives hiring priority to its members for its road construction projects and the reservation's economic well-being? Tables 19 and 20 map the question of hiring priority against the reservation's unemployment and per-capita income levels, respectively. In terms of unemployment, tribes with unemployment rates in excess of 40 percent are significantly less likely to offer hiring priority for tribal members than those tribes with lower unemployment rates. This would suggest that there might be a correlation between offering hiring priority to tribal members for road construction projects and tribal unemployment. Consequently, this would appear to be one way for a reservation to improve its economic standing. However, in examining data on per-capita income, it appears that tribes that extend hiring priority to tribal members tend to have lower per-capita income. The connection between hiring priority and a reservation's economic well-being is consequently unclear.

Income Level*	Hiring Priority for Tribal Members? Yes	No	Don't Know	% Yes*
Less than $4,000	6	5	3	55%
Between $4,000 and $6,000	14	18	4	44%
Between $6,000 and $10,000	8	12	5	40%
At least $10,000	1	3	1	25%
Total	29	38	13	

* - Includes reservations with data on per-capita income.

Table 20: Hiring Priority for Tribal Members by Per-Capita Income.

One way in which reservations may help to ensure that Indian people are given priority for employment on reservation road projects is through Tribal Employment Rights Offices (TERO). In 1977 the Tribal Employment Rights Planning committee, a temporary organization, formed the first 12 TEROs. Since then, the number of TEROs has grown to over 300. TEROs serve to protect the rights and resources of tribes and promote self-determination and sovereignty. Individual tribes fund and manage TERO; therefore it is up to each tribal government to determine whether they want to establish a TERO office (11).

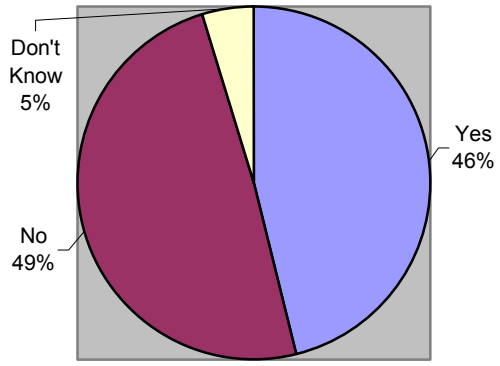

Figure 13: Does the Reservation Have a TERO Office?

As shown in Figure 13, nearly half of the respondents indicated that there are TERO offices on their reservations. Further analysis indicated that the presence of a TERO office seems to be correlated with income and unemployment in a similar fashion to the decision of tribes to offer hiring priority to tribal members for their road construction projects.

The similarity in responses and correlation patterns would suggest that reservations with TERO offices use them as vehicles through which to offer hiring priority. To test this, the correlation of respondents' answers to these two questions was examined. As shown in Table 21, the correlation is not as strong as might be expected. One-third of the tribes that offer hiring priority to tribal members do not have TERO offices. Conversely, nearly half of those respondents who knew they did not offer hiring priority to tribal members reported having TERO offices. This reflects that some TERO offices are not getting involved in the negotiating processes on road projects. Anecdotally, however, there is an increasing number of tribal transportation planners getting involved in the IRR program, Intertribal Transportation Association, and utilizing Section 638 Contracting – where the Tribal government contracts services instead of the BIA. This indicates that many tribal communities are beginning to take control of their transportation systems. Not being permitted or encouraged to get involved in transportation planning and implementation is detrimental to tribal sovereignty.

		Hiring Priority?			
		Yes	No	Don't Know	**Total**
TERO Office?	Yes	23	20	5	48
	No	12	31	8	51
	Don't Know	1	1	3	5
	Total	36	52	16	

Table 21: Relationship Between Hiring Priority and TERO Offices.

4.6 Existing Transportation Systems

Another perspective for establishing the transportation needs of tribal communities is to assess what types of transportation systems reservations currently have in place. Consequently, transportation planners were asked to list the systems they have in operation. As shown in Figure 14, most reservations have police and fire service, school bus systems, and emergency services, the latter of which is typically funded through the BIA or State programs.

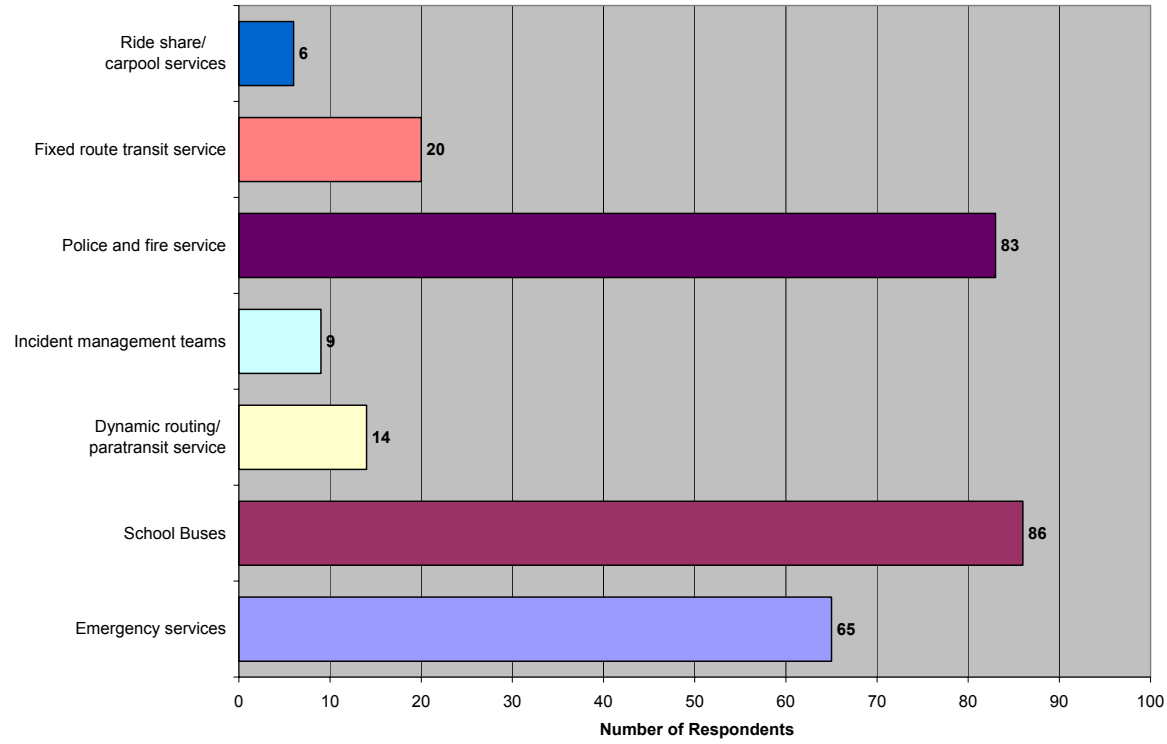

Figure 14: Transportation Systems Currently in Place on Reservations.

Few reservations reported having any type of transit service, be it fixed-route, paratransit, or a formal ridesharing program. From telephone interviews with transportation planners, it was established that many of the transit services in place on reservations are either transit systems that Tribal governments have found funding for or shuttle service provided by Indian Health Service for picking up residents. For the most part, the transit systems funded by tribal governments have limited funding. Moreover, the Indian Health Service is also depleting their funds providing transportation services for non-patients. For residents who do not have access to either one of these services, they must rely on relatives, friends, and neighbors for transportation.

Table 22 shows that reservations with higher population densities are less likely to have

			Percent of Reservations Having System						
Density (Per Sq. Mi.)		**# of Tribes***	Emergency Services	School Buses	Dynamic Routing/ Paratransit Service	Incident Management Teams	Police and Fire Service	Fixed Route Transit Service	Ride Share/ Carpool Services
Very Rural	Less than 10	25	84%	96%	20%	16%	88%	24%	0%
Rural	Between 10 and 25	13	69%	85%	8%	15%	92%	15%	0%
Small Urban	Between 25 and 100	19	37%	74%	11%	5%	79%	21%	11%
Urban	Between 100 and 1,000	23	57%	83%	17%	4%	83%	17%	9%
Very Urban	Greater than 1,000	19	53%	63%	11%	5%	58%	16%	5%
Total*			61%	81%	14%	9%	80%	19%	5%

* - Includes reservations for which land area estimates are available.

Table 22: Current Transportation Systems by Population Density.

Funding		# of Tribes*	Percent of Reservations Having System: Emergency Services	School Buses	Dynamic Routing/ Paratransit Service	Incident Management Teams	Police and Fire Service	Fixed Route Transit Service	Ride Share/ Carpool Services
Nominal	< $1K per year	15	60%	53%	7%	13%	67%	27%	7%
Minimal	$1K - 10K per year	11	27%	64%	9%	0%	55%	18%	9%
Moderate	$10K - 100K per year	21	71%	81%	24%	10%	81%	24%	10%
Significant	$100K - 1M per year	31	48%	87%	6%	6%	84%	13%	3%
Strong	$1M - 10M per year	20	85%	100%	20%	15%	95%	15%	0%
Very Strong	> $10M per year	1	100%	100%	100%	0%	100%	100%	0%
Total*		**99**	61%	81%	14%	9%	80%	19%	5%

* - Includes reservations for which Federal transportation funding levels are known.

Table 23: Current Transportation Systems by Federal Funding Level.

Unemployment Level*	# of Tribes*	Percent of Reservations Having System: Emergency Services	School Buses	Dynamic Routing/ Paratransit Service	Incident Management Teams	Police and Fire Service	Fixed Route Transit Service	Ride Share/ Carpool Services
Less than 10%	5	80%	100%	0%	20%	100%	20%	20%
Between 10% and 20%	17	47%	65%	24%	12%	71%	12%	12%
Between 20% and 30%	22	50%	86%	14%	0%	77%	27%	0%
Between 30% and 40%	18	67%	94%	6%	6%	83%	17%	0%
Over 40%	12	83%	92%	8%	8%	100%	25%	8%
Total*	74	61%	85%	12%	7%	82%	20%	5%

* - Includes reservations for which unemployment data is available.

Table 24: Current Transportation Systems by Unemployment Level.

many of these transportation systems. This seems logical for two reasons: first, because funding levels tend to be inversely correlated with population density; and second, because more urbanized reservations may be able to enter into agreements with adjacent, non-Indian communities for some of these systems. Rural reservations seem to be more likely to have paratransit or fixed-route service than more urban reservations, but less likely to have carpooling programs.

This research has indicated that many transportation planners find Federal and State funding levels to be inadequate for supporting their programs. It may be helpful to learn what systems reservations with higher funding levels tend to support. Table 23 explores this relationship. As can be seen, there is a clear connection between a reservation's funding and its likelihood to have school buses and to provide its own police and fire services. Interestingly, increased funding levels do not seem to be strongly connected to whether or not a reservation has fixed-route transit or paratransit service. While many planners expressed a clear desire for improved transit and mobility services, there are apparently many conflicting priorities that impede these systems being implemented and improved.

It was noted earlier that reliable transportation is often a hindrance for tribal members obtaining and maintaining steady employment. Therefore, another question that was examined was whether there was a connection between unemployment levels and the transportation systems currently in place on reservations. As Table 24 indicates, there does not appear to be a

strong correlation between unemployment levels and the presence of fixed-route transit or paratransit systems.

5 SUMMARY AND NEXT STEPS

The Tribal Transportation and Safety Needs Survey provided a good overview of some of the challenges that face reservations across the western United States. Some of these problems include:

- poor economic conditions,
- geographic isolation,
- deficiencies in traveler safety and emergency response,
- lack of support for public transit/mobility,
- inadequate Federal and State transportation support, and
- lack of trained transportation planners.

One important finding in this survey is that, in spite of the common ills that plague many reservations, there is significant dissimilarity between reservations as well. These differences mean that transportation solutions implemented to assist tribes, especially ITS solutions, cannot be developed and implemented on a "one-size-fits-all" basis.

Reservations appear to be a fertile ground for ITS field operational tests. Few reservations expressed having familiarity with ITS, so there is little awareness as to the benefits ITS can provide for tribal members in terms of improving safety, enhancing mobility, and encouraging tourism. It is important to recognize, however, that given the decaying roadway infrastructure that many reservations face due to funding shortfalls, ITS may be perceived by tribal members as an unnecessary luxury. Therefore, the following steps are recommended for building off of the results of this survey.

- Identify a "champion" within the U.S. Department of Transportation (USDOT) who recognizes the transportation needs of tribal reservations and who may be able to encourage USDOT to consider a field operational test.

- Identify candidate reservations for ITS field operational tests. Follow-up telephone conversations with many tribal planners have yielded significant input toward this goal.

- Conduct a thorough, reservation-specific transportation needs assessment. This needs assessment should also focus on identifying what sorts of ITS applications each tribe believe would be most beneficial to their tribes. Given the lack of awareness of ITS at the reservation level, this would likely include a significant educational component.

- Select one or more reservations for a field operational test. The possibilities for deployed technologies are limited only by available funding.

- Deploy and evaluate ITS technologies. This evaluation should include not only standard measures of effectiveness but the perception of tribal members through surveys as well.

Tribal transportation has a long way to go before reaching parity with the rest of the country. To ensure that all needs are met and funding is available, tribal governments need to take an increasingly active role in Federal and State politics to gain funding. Likewise, the BIA, Federal and State government agencies need to put more effort in assisting tribal planners in gaining funding. They also need to make sure there are trained personnel in tribal transportation offices that will see that all road projects are successfully completed.

This survey provides substantial guidance on how to match plausible solutions to existing transportation problems on reservations. As funding becomes available, these solutions may be implemented to improve the quality of life for citizens living on and traveling to reservations.

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8. David C. Grossman, Jonathan R. Sugarman, Caroline Fox, and John Moran. "Motor-Vehicle Crash-Injury Risk Factors Among American Indians." Accident Analysis & Prevention, Volume 29, Number 3, May 1997.

9. Bureau of Indian Affairs (IRR) Division of Transportation – Relative Need Formula. www.irr.bia.gov.

10. "Indian Reservation Roads Partnering into the Millennium." Joint Intertribal Transportation Association and the Bureau of Indian Affairs Annual Symposium on Transportation, Reno, Nevada, December 13-15, 1999.

11. "638 Contracting & TERO Session." Conference by the Council for Tribal Employment Rights, Denver, Colorado, March 17-18, 1999.

APPENDIX A: TRIBAL TRANSPORTATION AND SAFETY NEEDS SURVEY

This survey is being undertaken by Western Transportation Institute at Montana State University in order to assess transportation needs on reservations. The survey will provide tangible data for Western Transportation Institute to research and explore special programs from the U.S. Department of transportation that might be utilized on reservations. Please take a few minutes to answer the questions below.

1. What do you consider the single most challenge faced by reservation communities? (Check one)
   _____ economic development
   _____ road and transportation safety
   _____ trained transportation personnel
   _____ other
   Please identify_____

2. Which are the primary transportation challenges faced by your reservation community? (**Check top three, rank from 1-3, 1 representing highest**)
   _____Increase Safety
   _____Improve Emergency Response
   _____Improve Commercial Vehicle Operations (such as monitoring hazardous cargo)
   _____Increase Travel Information & Trip Enhancement
   _____Improve Mobility/Transit (for example, community bus system)
   _____Improve Interagency Communications
   _____Increase Economic Activity

3. Do you think alcohol consumption plays a significant role in vehicle crash fatalities in your reservation communities?
   _____ Yes _____ No _____ Not Sure

4. Have you heard of the U.S. Department of Transportation's Intelligent Transportation Systems?
   _____ Yes _____ No

If yes, based on your perception of the challenges faced by your reservation community which of ITS applications and technologies would be useful to your existing transportation system? (**Check top three, rank from 1-3, 1 representing highest**)

_____Traveler Safety and Security (e.g., signs altering drivers of road conditions)
_____Tourism and Travel Information Services (e.g., traveler information and mobility services)
_____Infrastructure Operations & Maintenance (e.g., responding to weather conditions, manage construction and work zones)
_____Emergency Services (e.g., improved notification and response when an accident occurs)
_____Public Traveler Services/Public Mobility Services (e.g., public transportation)
_____Fleet Management (e.g., scheduling, billing, routing, locating, and maintenance)
_____Commercial Vehicle Operations (e.g., regulation, management and logistics)

5. Do you feel that your tribal government receives sufficient support from Federal and State governments in transportation improvements?
   _____ Yes _____ No _____ Do Not Know

6. Do you feel tribal members are given hiring priority for employment on road projects in your community?
   _____ Yes _____ No _____ Do Not Know

7. Do you have a Tribal Employment Rights Office on your reservation?
   _____ Yes _____ No _____ Do Not Know

8. What State _____and reservation do you represent?_____

9. What is your tribal affiliation?_____

10. What is your job title?_____

    How long have you had this title?_____3 - 6 months _____6 months – 1 year
    _____ more than a year _____ under 5 years _____ more than 5 years

11. What transportation systems and services do you currently have in your community? (Check all that apply)
    _____ Emergency services (Ambulance) _____ Police and fire service
    _____ School Buses _____ Fixed route transit service
    _____ Dynamic routing/para transit service _____ Ride share/car pool services
    _____ Incident management teams

12. Are there other areas of concerns that were not identified in this survey?

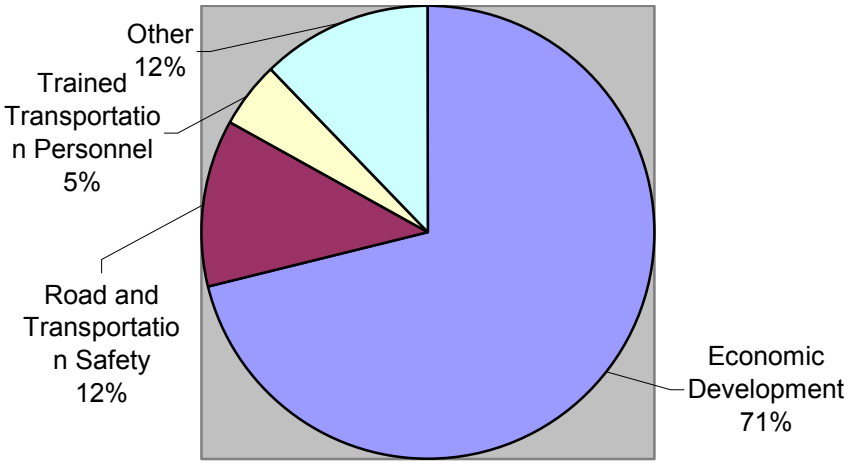
13. Can we contact you about this survey? _____ Yes _____ No
    If so, please provide the following information (please print):
    Name:_____
    Title/Position:_____
    Employer:_____
    Address:_____
    Phone:_____ E-mail:_____

Please return to:
Shelley Fleming
Western Transportation Institute
416 Cobleigh Hall, MSU
Bozeman, MT 59717
Or fax to: (406) 994-1697
E-mail: shelleyf@coe.montana.edu

Thank you for your time and cooperation!

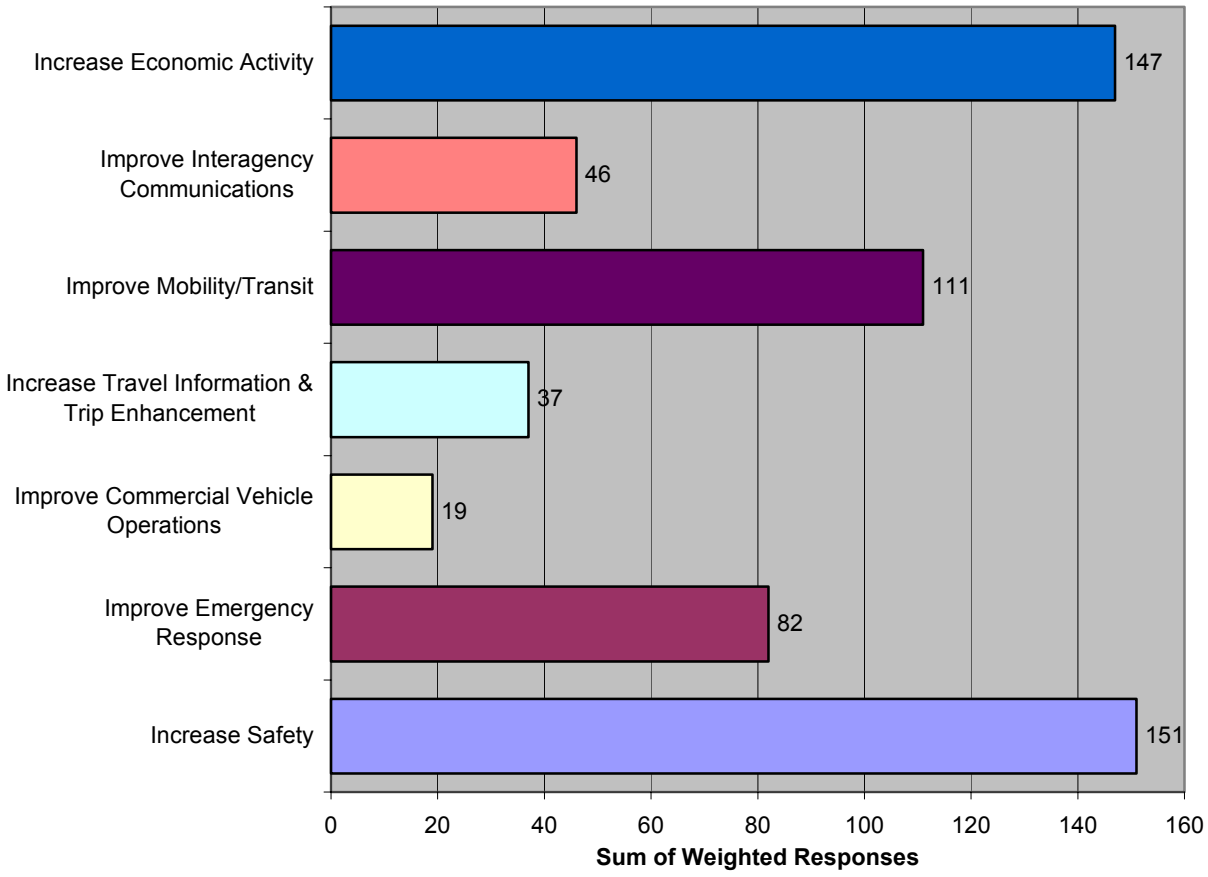
APPENDIX B: SURVEY RESULTS

Question 1: What do you consider the single most challenge faced by reservation communities?



	Responses	
Challenge	Number	Percent
Economic Development	76	71%
Road and Transportation Safety	13	12%
Trained Transportation Personnel	5	5%
Other	13	12%
Total	**107**	**100%**

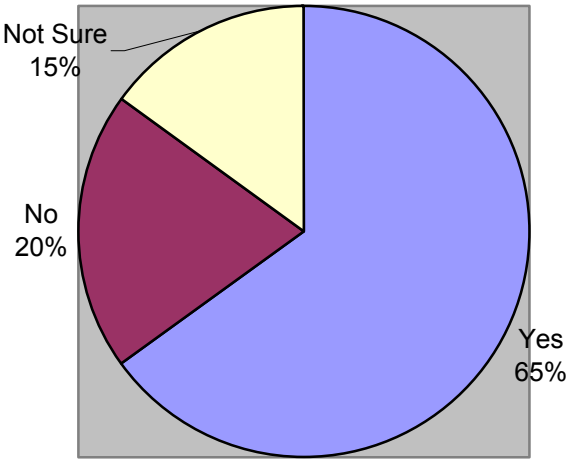
Question 2: Which are the primary transportation challenges faced by your reservation community? (Check top three, rank from 1-3, 1 representing highest)



	Ranking			Weighted
Challenge	1st	2nd	3rd	**Score**
Increase Safety	30	23	15	151
Improve Emergency Response	12	17	12	82
Improve Commercial Vehicle Operations	1	3	10	19
Increase Travel Information & Trip Enhancement	7	4	8	37
Improve Mobility/Transit	25	12	12	111
Improve Interagency Communications	3	11	15	46
Increase Economic Activity	27	24	18	147
Total	**105**	**94**	**90**	

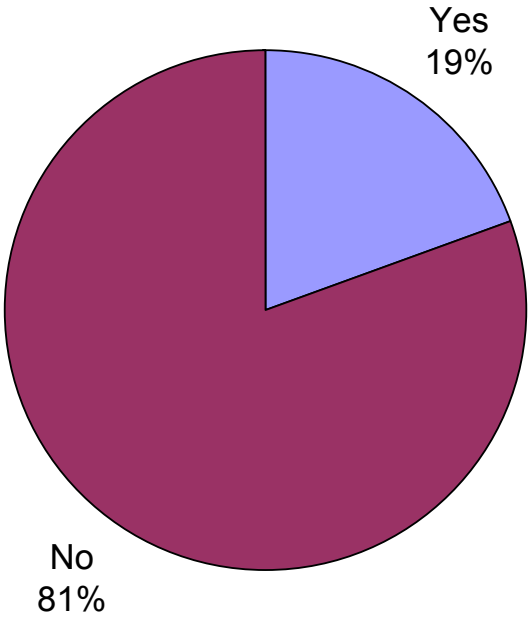
Note: Top challenge is weighted with three points, second-ranked challenge is weighted with two points, and third-ranked challenge is weighted with one point.

Question 3: Do you think alcohol consumption plays a significant role in vehicle crash fatalities in your reservation communities?



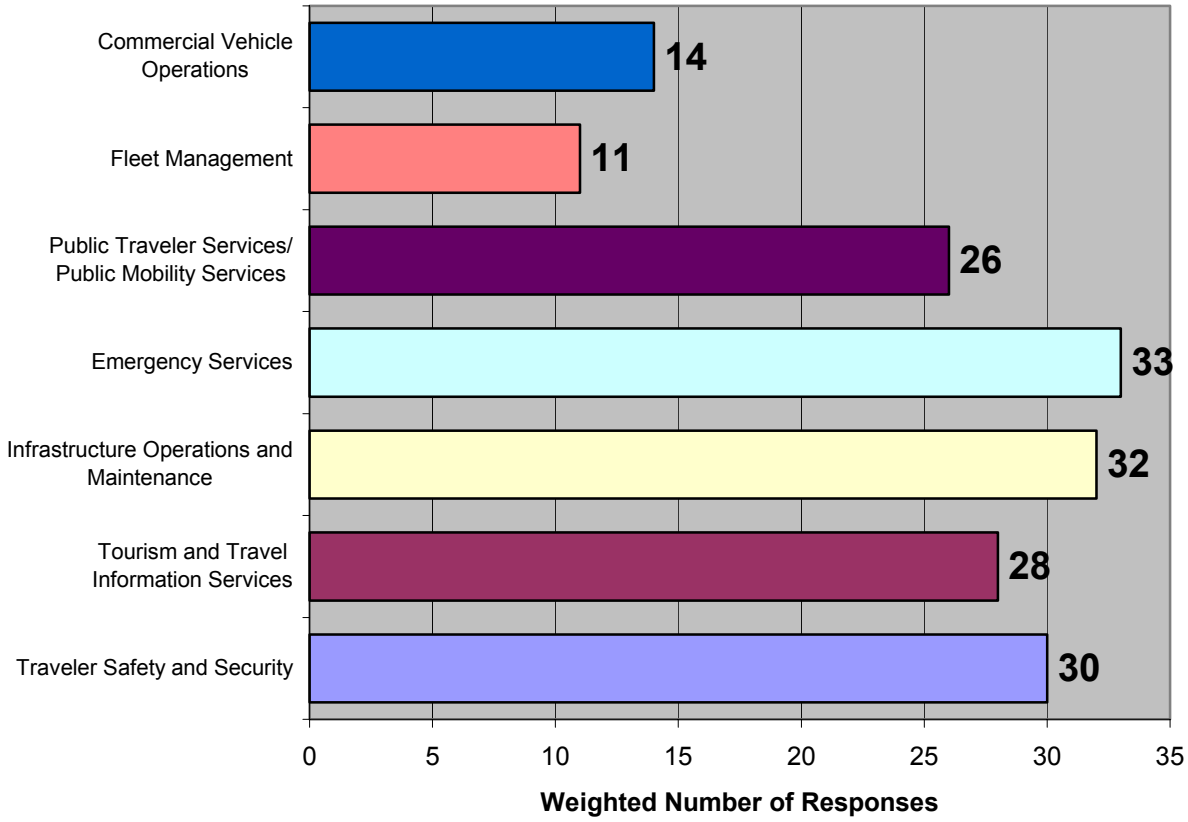
	Respondents	
	Number	Percent
Yes	69	65%
No	21	20%
Not Sure	16	15%
Total	**106**	**100%**

Question #4: Have you heard of the U.S. Department of Transportation's Intelligent Transportation Systems?



	Respondents	
	Number	Percent
Yes	20	19%
No	87	81%
Total	**107**	**100%**

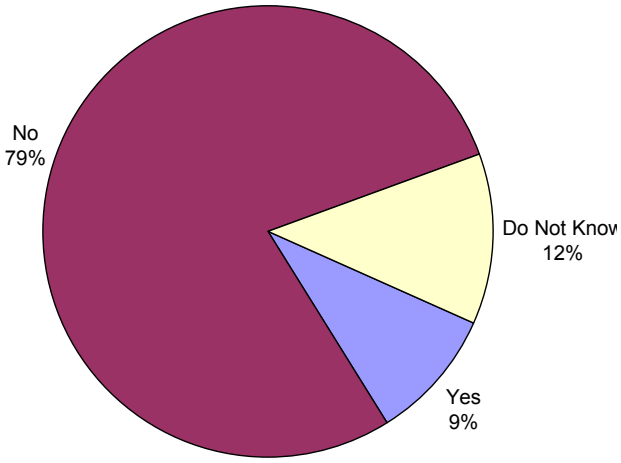
Question #4a: If yes (to question 4), based on your perception of the challenges faced by your reservation community which of ITS applications and technologies would be useful to your existing transportation system? (Check top three, rank from 1-3, 1 representing highest)



	Ranking			Weighted
Critical Program Area (CPA)	1st	2nd	3rd	**Score**
Commercial Vehicle Operations	4	1	0	14
Fleet Management	1	4	0	11
Public Traveler Services / Public Mobility Services	5	3	5	26
Emergency Services	6	5	5	33
Infrastructure Operations and Management	2	9	8	32
Tourism and Travel Information Services	6	4	2	28
Traveler Safety and Security	6	2	8	30
Total	**30**	**28**	**28**	

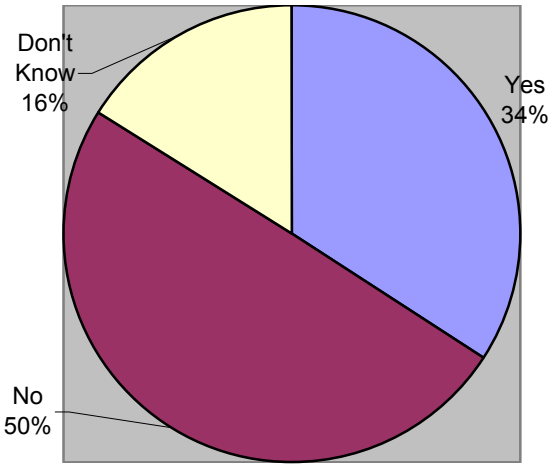
Note: Top-ranked CPA weighted with three points, second-ranked CPA weighted with two points, and third-ranked CPA weighted with one point.

Question 5: Do you feel that your tribal government receives sufficient support from Federal and State governments in transportation improvements?



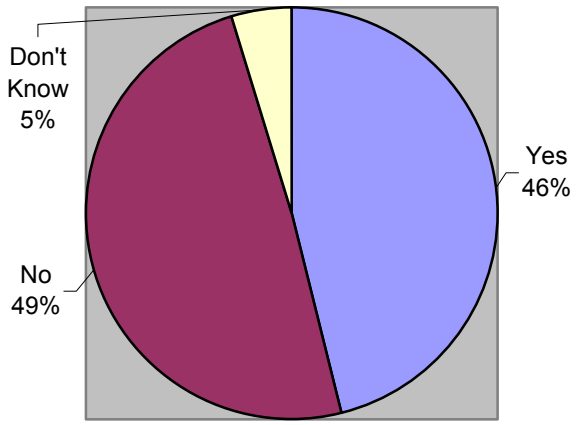
	Respondents	
	Number	Percent
Yes	10	9%
No	84	79%
Do Not Know	13	12%
Total	**107**	**100%**

Question 6: Do you feel tribal members are given hiring priority for employment on road projects in your community?



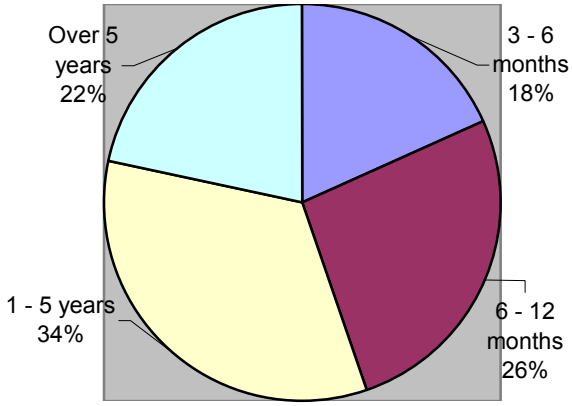
	Respondents	
	Number	Percent
Yes	36	34%
No	52	50%
Do Not Know	17	16%
Total	**105**	**100%**

Question 7: Do you have a Tribal Employment Rights Office (TERO) on your reservation?



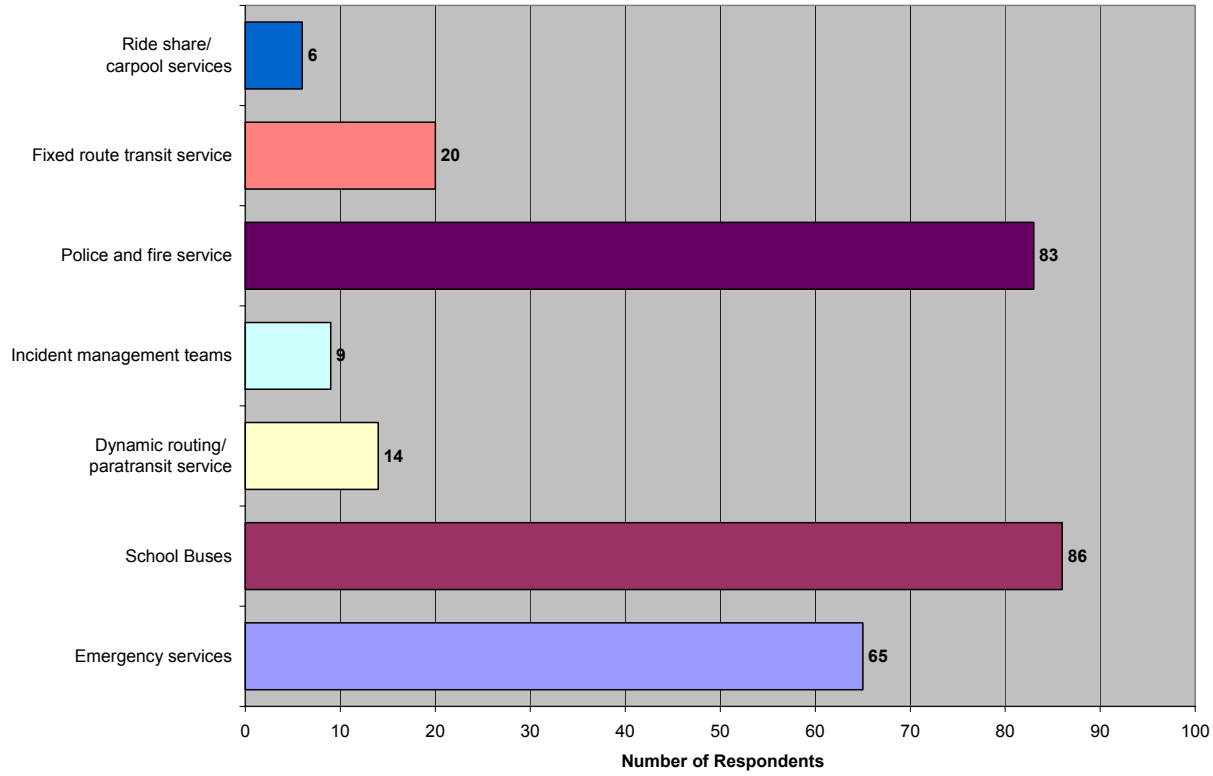
	Respondents	
	Number	Percent
Yes	48	46%
No	51	49%
Do Not Know	5	5%
Total	**104**	**100%**

Question 10b: How long have you had your current job title?



	Respondents	
Time at Current Position	Number	Percent
3 - 6 months	9	9%
6 - 12 months	15	14%
1 - 5 years	48	46%
Over 5 years	32	31%
Total	**104**	**100%**

Question 11: What transportation systems and services do you currently have in your community?



(out of 107 respondents)