

CHARACTERIZATION OF UNDERSERVED POPULATION PERCEPTIONS AND MOBILITY NEEDS IN CONNECTED-VEHICLE AND SMARTER CITY ENVIRONMENTS

FINAL PROJECT REPORT

by

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16. Abstract This outreach effort aimed to better understand and characterize the mobility disadvantaged and underserved populations' perceptions of, along with their safety-related mobility needs in, connected-vehicle and smart-city environments. It also aimed to educate and inform these communities about the opportunities for mobility and safety improvements that these technologies could provide. This report discusses the underserved populations and communities in both rural and urban areas in the Pacific Northwest (PNW). Overall, connected vehicle and smart mobility technologies, tools, and applications will play a crucial role in improving the mobility and safety for all underserved populations. These technologies will promote the independence, safety, and well-being of older persons, enabling them to maintain active and fulfilling lifestyles as they age. Similarly, the technologies will offer a range of benefits for people with physical and mental disabilities, enhancing their independence, safety, and overall quality of life. They also have the potential to address transportation challenges, promote cultural preservation, and improve access to essential services for Native American Tribes and communities. Other mobility underserved populations, such as households with no car ownership, can have access to convenient, affordable, and sustainable transportation options that enhance mobility, connectivity, and quality of life for these underserved groups in both urban and rural communities. Examples of smart-city technologies that have the potential to assist underserved populations include adaptive technologies and personalized services for people with disabilities, AI-inclusive design, advanced driver assistance systems, real-time multimodal trip planning, enhanced safety features for older drivers, door-to-door mobility services, older population assistive technologies, age-friendly infrastructure, and on-demand transportation services.			
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LIST OF ABBREVIATIONS

ADA	Americans with Disability Act
AIAN	American Indian and Alaskan Native
CDC	Centers for Disease Control and Prevention
DUI	Driving under the influence
EMS	Emergency medical services
FHWA	Federal Highway Administration
ITD	Idaho Transportation Department
LCSC	Lewis-Clark State College
MOD	Mobility on demand
MVC	Motor vehicle crashes
NIATT	National Institute for Advanced Transportation Technology
NPT	Nez Perce Tribe
PFD	Permanent Fund Dividend
PHA	Public housing authority
PMV	Passenger motor vehicle
PNW	Pacific Northwest
SOAR	Safe On All Roads
STSP	Strategic Transportation Safety Plan
TTPSF	Tribal Transportation Program Safety Funds
UI	University of Idaho
WSU	Washington State University
WTSC	Washington Traffic Safety Commission

EXECUTIVE SUMMARY

This outreach effort aimed to better understand and characterize the mobility disadvantaged and underserved populations' perceptions of, along with their safety mobility needs in, connected-vehicle and smart-city environments. It also aimed to educate and inform these communities about opportunities for mobility and safety improvements that these technologies could provide. This report discusses the underserved population and communities in both rural and urban areas in the Pacific Northwest (PNW).

The mobility underserved communities included in this outreach effort were persons with physical, psychological, and mental disabilities, older populations, Native American communities living on reservations, and persons living in households with no car ownership.

Overall, connected vehicles and smart mobility technologies, tools, and applications will play a crucial role in improving the mobility and safety of all underserved populations. These technologies will promote the older population's independence, safety, and well-being, enabling them to maintain active and fulfilling lifestyles as they age. Similarly, they will offer a range of benefits for people with physical and mental disabilities, enhancing their independence, safety, and overall quality of life. These technologies also have the potential to address transportation challenges, promote cultural preservation, and improve access to essential services for Native American Tribes and communities. Other mobility underserved populations, such as households with no car ownership, can have access to convenient, affordable, and sustainable transportation options that enhance mobility, connectivity, and quality of life for these underserved groups in both urban and rural communities. Examples of smart-city technologies that have the potential to assist underserved populations include adaptive technologies and personalized services for people with disabilities, AI-inclusive design, advanced driver assistance systems, real-time multimodal trip planning, enhanced safety features for older drivers, door-to-door mobility

services, older population assistive technologies, age-friendly infrastructure, and on-demand transportation services.

CHAPTER 1 INTRODUCTION

1.1 Overview

Connected vehicles, autonomous vehicles, smart mobility, and smart-city technologies have the potential to transform the nations' critical transportation system. The increased number of on-demand mobility options and the information available to travelers have created unlimited opportunities to maximize our surface transportation system's safety and efficiency. However, as technological innovation continues to progress at light speed, the country's mobility in underserved communities is increasingly being left behind. The objective of this Pacific Northwest Transportation Consortium (PacTrans) outreach effort was to better understand and characterize the underserved populations' perceptions of and mobility needs in connected and smart-city environments. As part of this outreach effort, the project team, in partnership with stakeholders from a variety of underserved populations, conducted extensive outreach activities in the form of focus group meetings and interviews to gather information about these groups' mobility needs and perceptions of new mobility opportunities. As part of these efforts, presentations covering different mobility options in connected vehicles and smart-city environments were used to inform and educate the targeted underserved communities about the potential and requirements of these technologies. The mobility-underserved communities that were included in this outreach effort were persons with physical, psychological, and mental disabilities, older populations, Native American communities living on reservations, and persons living in households with no car ownership.

1.2 Project Goal

The primary goal of this outreach effort was to better understand and characterize underserved populations' perceptions of and mobility needs in connected vehicles and smart-city environments and to educate and inform these communities about the opportunities for mobility

and safety improvements that these technologies can provide. This study covers underserved population and communities in both rural and urban areas in the Pacific Northwest (PNW).

1.3 Project Methodology and Approach

The following tasks were executed as part of this outreach effort:

- Recruit community stakeholders from various underserved populations.
- Initiate facilitated discussion among a wide representation of stakeholders.
Stakeholders were divided into different focus groups based on geographic distribution.
- Develop a web-based data collection tool to collect data and record perceptions regarding travel challenges for different communities. The data collected were used to document and describe different travel challenges for the mobility of underserved groups and to identify their mobility needs and the opportunities that connected vehicles and smart mobility environments can offer to address these challenges.
- Facilitate a second round of discussions with different stakeholders to characterize their needs and identify potential smart-city implications and solutions.

1.4 Report Organization

The study's background and literature review are presented in Chapter 2. Chapter 3 includes documentation of the characteristics of the mobility-underserved and disadvantaged groups in the PNW. A summary of the project's outreach effort is presented in Chapter 4. The findings from interviews with Tribal community representatives and focus group meetings are presented in Chapter 5 and Chapter 6, respectively. The study conclusions are presented in Chapter 7.

CHAPTER 2 STUDY BACKGROUND AND LITERATURE REVIEW

The promises of freedom and liberty, as well as the declaration that all men are created equal, are promises the American Constitution has championed since its writing. However, it is apparent in American society that numerous groups have been left behind and do not feel these liberties have been rightfully given to them. These observations can be found in the Pacific Northwest by exploring the status of disadvantaged groups, as well as understanding efforts that communities and governments have made to increase the standard of living among these individuals.

Understandably, those within the American Indian and Alaskan Native (AIAN) communities have struggled for centuries with the federal government to secure Tribal sovereignty and rebuild their ways of life after a history of persecution and extermination. Likewise, those in American society who are physically or mentally disabled have faced prejudice through stereotyping and being considered inferior (Disability Rights, 1981, p. A-1). Those of low-income status struggle to increase their standard of living in the face of financial stress and difficulty (Slocum, 2018, p. 3).

To start to understand the struggles of these disadvantaged groups within American society, one must understand not only their history, but also present implications. What has been done to help underprivileged people? What is currently being done? Has it had an effect, whether positive or negative? To answer these questions, one must explore the existing literature, which reveals what can and must be done to help the most disadvantaged individuals within American communities.

AIAN communities hold a unique place in American history. Faced with incredible challenges throughout history, they have become a resurgent part of American society by adapting to the issues that have faced them while maintaining their unique cultural identities and

traditional values. Despite their overwhelming success in combating issues within their communities, Tribes of the PNW have obvious areas of struggle, particularly within the area of traffic safety.

Among AIAN communities, motor vehicle crashes (MVC) account for a disproportionately large percentage of fatalities (“An Analysis of Traffic Fatalities,” 2021, 3). The Centers for Disease Control and Prevention (CDC) has stated that the leading cause of death among AIAN groups between the ages of 1 and 44 are unintentional injuries and MVCs. The CDC has stated that between 1999 and 2019, 15,345 deaths were attributed to MVC-related causes across United States reservations. These data suggest that more attention is necessary to combat MVC incidents among AIAN communities (“Leading Cause,” 2019).

Idaho statistics exemplify the problem across the PNW region. Of the total MVC-related fatalities recorded between 2005 and 2019, around 8 percent occurred on one of the state’s five Native American reservations. Principle causes of these MVCs-related fatalities included alcohol-impaired driving (accounting for 36 percent of incidents), distracted driving, and relaxed usage of restraints (FARS, 2021).

Collecting data from AIAN communities remains challenging. The sovereignty of Tribes does not compel them to report MVC incidents to outside entities. “Tribes either do not report or the information provided is not complete, obtaining accurate crash and injury data to identify traffic safety trends is difficult” (“Highway Safety Plan,” 2020, p. 4).

At the federal level, Section 1117 of the federal FAST Act acknowledges that AIAN communities have disproportionate fatalities and crash statistics. Having improved reporting methods through law enforcement and Tribal governmental departments could help AIAN

communities with safety planning as well as successful application of federal and state funds related to safety improvements.

Contributing factors to this issue are found not only in the data reported by AIAN communities but also in the complex jurisdictional policies and laws that govern Tribal lands. “As a general rule, state laws do not apply to Indians in Indian country; Tribal and federal laws apply instead” (Pevar, 2012, pp. 20-21). Additionally, Zaferatos (1998) stated that, although

Tribes are generally understood to retain sufficient authority to enforce civil laws against all reservation residents, the practical ability of Tribes to control their territories has been indeterminate due to the complex composition of land tenure on the reservation and to the historical intrusion of state political authority on many reservations. (399)

The trial case *Oliphant v. Suquamish Indian Tribe* ruled that Tribes do not have inherent sovereign power and criminal jurisdiction over non-Indigenous people (435 U.S. 191). This complex web of laws creates conflict and mistrust between AIAN communities and state and federal governments. It is for this reason that data collection is complicated. Because of historical mistrust and conflicting laws, the prevalent traffic safety issues among these communities are not comprehensive.

Many PNW Tribes have recognized the issue that exists on their lands and have taken measures to combat traffic incidents. Various engineering efforts have been implemented among the Tribes; additionally, there have been considerable efforts to improve traffic safety through the means of creating traffic safety plans. Some efforts have stagnated because of insufficient funding and turnover (Prescott). The Idaho Transportation Department (ITD) published its Idaho Highway Safety Plan for fiscal year 2022. The plan covers strategies to increase transportation safety in nine different program areas, which encompass reduction of fatalities in distracted driving crashes, fatalities involving impaired drivers, and the number of unrestrained passenger motor vehicle (PMV) fatalities (5-6).

In addition to countermeasures, focus has been given to strengthening transportation safety among Idahoans by including Tribal communities in planning short-term and long-term projects. Through the FAST Act, the Federal Highway Administration (FHWA) Office of Federal Lands provides Tribal Transportation Program Safety Funds (TTPSF) to federally recognized AIAN communities. Through these means, Tribes in Idaho have received funds to develop safety plans and roadway improvements on reservations (“Highway Safety,” 2020, p. 5).

The Nez Perce Tribe (Nimiipuu) published a Strategic Transportation Safety Plan (NPT-STSP) in 2016 with the vision of providing maximum safety to Tribal members, community citizens, and visitors of the reservation. Tribal, state, and federal entities have collaborated to address various areas of emphasis within Nez Perce lands. Included among these emphasis areas have been the implementation and enforcement of education to reduce collisions caused by risky behaviors. Strategies have included increasing awareness of the danger and consequences associated with driving under the influence (DUI), distracted driving, and restraint usage, as well as increasing the presence of law enforcement (“Nez Perce,” 2016, pp. 37-38).

The NPT-STSP also incorporates existing materials from awareness and outreach programs to educate Tribal members. This is one strategy to reduce collision fatalities. These materials include resources from outreach programs such as Parents are Key, Alive at 25, and Idaho Teen Driving (“Nez Perce,” 2016, p. 40). In addition to the Nez Perce, the Kootenai Tribe of Idaho has published a transportation safety plan that focuses on making roads on the reservation safer by developing and implementing a student driver education program (“Strategic Transportation,” 2016, p. 7).

Although considerable attention has been given to the high traffic fatality rate on AIAN lands, a combined effort of Tribes within the PNW to cooperate on the like-minded mission of

lowering MVC-related fatalities on reservation lands could work to maximize transportation safety among Tribal communities. Furthermore, Tribal safety should be addressed in each state's strategic transportation plan, with proper goals and strategies to address the issue. Identifying the target population, fostering relationships to garner their participation, and creating prospects for public involvement are proven strategies to engage underserved AIAN communities effectively (Aimen, 2012, p. S-5).

In addition to AIAN communities, other communities within the PNW remain disadvantaged. Research shows that there are significant gaps in advantage between disabled groups and nondisabled groups. These gaps are compounded by the feeling of individuals with disabilities that they must work harder to achieve the same societal outcomes as nondisabled people (Scouras, 2005, p. vi). These beliefs can most obviously lead to a feeling of inferiority in relation to the rest of society. Even with the passage of the Americans with Disabilities Act of 1990 (ADA), the physically and mentally disabled of the PNW have continued viewing themselves as being separate or disadvantaged in relation to nondisabled society.

Scouras (2005) reviewed surveys conducted among the population with disabilities of Washington state to understand how individuals with disabilities viewed themselves in comparison to the population without disabilities. The findings revealed that the population with disabilities believed that even with the advantages the ADA had established, they still had to work harder in society to achieve the same level of success as a person without disabilities. Consequently, the population of individuals with disabilities in Washington state has felt feeling left behind and sidelined in the face of prejudice (Scouras, 2005, p.17).

Understanding how the ADA was passed in 1990 is crucial to understanding how the population of individuals with disabilities of Washington state still feel left behind. Scouras

(2005) attributed this to three factors: “media coverage of the passage of the ADA, judicial impact on the ADA, and lack of detailed qualitative research” (3).

The media response and lack of coverage surrounding the passage of the ADA did not compare to the historical coverage of previous civil rights bills. In fact,

the media had been particularly influential in battles for the passage of civil rights legislation to protect minorities. However, when disability rights lobbyists set out to pass the ADA, they made the slightly unorthodox decision of explaining very little to the press regarding the desperate need for such sweeping anti-discrimination legislation. Scouras, 2005, p. 4

Furthermore, the judiciary has consistently limited implementation of the ADA for individuals with disabilities by narrowing the definition of a disabled person. In both Supreme Court cases *Sutton v. United Airlines* (527 U.S. 471 (1999)) and *Murphy v. United Parcel Service* (527 U.S. 516 (1999)), the Court limited the definition of a disabled person, narrowing the parameters to exclude individuals who have mitigating factors to manage their disability. In other words, if an individual’s medication is helping them manage their disability effectively, then that person would not be considered disabled under the ADA (The Americans with Disabilities Act 2003, 5).

Recently, in American society, it has become more apparent than ever that an ample amount of attention must be given to those who are mentally disabled. Anthony (1972) explained that the traditional ways of educating the public about people with disabilities, whether physical or mental, have not produced effective results among society. According to the author, attempting to change the attitudes of the nondisabled population toward people with disabilities is done in one of three ways: “(a) providing information about people with disabilities, (b) having contact with a person with disabilities, and (c) providing an experience combining both contact and information” (p. 117).

Effectively understanding fellow citizens who struggle with mental impairment is not an issue isolated to the PNW but one that occurs across American society. Too many violent incidents, in recent memory, have been attributed to a person with a mental disability. This not only challenges the rest of society to understand their condition but to find ways to help their fellow citizens. Dresser (1996) claimed that “since U.S. regulatory policy fails to resolve many ethical issues presented...procedures for capacity assessment and information disclosure should enhance the autonomy of capable subjects and accurately identify subjects incapable of independent choice” (67).

Whitaker (2005) pointed out an ever-increasing dependence on psychiatric medication among the American population. “In 1955, the government reported 1,675,352 patient-care episodes, or 1,028 episodes per 100,000 population. In 2000, patient-care episodes totaled 10,741,243,3,806 per 1,000,000 population. That is nearly a fourfold per capita increase in 50 years” (24). Whitaker made an interesting connection between these increasing episodes, and the amount of psychiatric medication being prescribed. Likewise, Whitaker pointed out that

Up until the 1950s, the number of hospitalized mentally ill provided a rough estimate of this group. Today, the disabled mentally ill typically receive a disability payment either from the Social Security Disability Insurance (SSDI) program or the Supplemental Security Income (SSI) program, and many live in residential shelters or other subsidized living arrangements. (p. 24)

It seems as if American society looks the other way. As individuals increasingly rely on psychiatric drugs to cope with their mental illness, life goes on as if no problem exists. It is a comfortable existence, to ignore the issues that are present or stave them off with medication. In many cases, medication is absolutely needed and does wonders for those who do deal with mental illness. This is something that the author can say from personal experience. However, the epidemic of mental illness that this country is currently facing goes far beyond the borders of management. Much of the current political climate, which has caused a distraction of division,

impedes this country's ability to effectively address this issue that increasingly plagues society and the individuals who suffer from it.

Rural and Indigenous communities and those who suffer from physical and mental disabilities are not the only disadvantaged groups in the PNW. One must also consider those not making enough to support a substantial living. Recently, the American Dream has become arduous for many to achieve. Incidents such as the Great Recession of 2008 and the 2019-2023 Coronavirus Pandemic have exasperated this issue. Many feel separated from the future, feeling as if the struggle is too harsh to achieve the Dream. The Dream is quite simple. Americans want families, houses, financial security, something to rely upon in retirement; however, today, in light of all that has recently happened, this Dream may seem far away and too difficult to achieve. It leaves many low-income people asking: Is it even worth it?

Patricia Prohaska, a resident of the state of Oregon and a recent victim of a serious car accident, experienced issues in the Great Recession that took nearly everything she had; she kindly obliged to give an interview for this research. After the recession hit in 2008, she lost her retirement savings, totaling almost \$250,000. Likewise, she lost her house, car, job, and pension. She has been working diligently since to recover. However, this year, she was involved in a serious car accident that nearly took her life. "Just to get flown to the hospital, the bill came back at 90,000 dollars!" she exclaimed. Today, she is facing bankruptcy as her medical bills continue to pile up (Prohaska, 2022). As exemplified by Patricia's case, varying situations can most definitely compound to create an impossible situation.

Ohman (1999) described how social and economic restructuring over the past 40 years has resulted in an increased number of low-income individuals. Ohman cited these changes as

being the reason for an ever-increasing divide between low-income and high-income individuals (pp. 161-62).

States within the PNW have been diligent in their efforts to support those of low-income status. For example, PNW states have worked specifically to increase affordable housing for low-income individuals across the region. Kleit et al. (2015) explained how public housing authorities (PHAs) in the states of Oregon and Washington mitigated the disastrous recession in 2008. They pointed out several actions that PHAs took during this time to sustain the amount of development that they had thus far experienced. These included mixed financing, diversification of funding, and focusing on alleviation for those in poverty rather than on expanding services (pp. 635-36). In the face of such an incredible financial disaster, PHAs in both Oregon and Washington were committed to implementing tactics to ensure survival in addition to pursuing their mission.

Among those who are of low-income status, it is not only difficult to find an affordable place to live but also to own a car. Car ownership can be challenging even for those who can afford it. In many cases, the car is financed and, therefore, comes with a monthly payment. Additionally, one must be able to afford auto insurance. If that were not enough, one must be able to pay for regular maintenance and unexpected fixes the vehicle will most definitely require. In considering low-income individuals, one must ask whether car ownership is an indicator of a positive influence or a negative one.

Johnson et al. (2009) asked this very question. The authors claimed that car ownership does not necessarily give an accurate picture of whether a demographic is advantaged or disadvantaged by not owning a car. The authors gave “evidence to show that zero car ownership can be a positive feature of low-income households and that conversely high car ownership can

put significant financial stress on households with low-income” (439). In any case, those among the low-income demographic must ask themselves if the benefits outweigh the costs of buying and maintaining a car. Transportation, luckily, comes in numerous forms, and there are alternative methods within communities and through an individual’s own ability to get from point A to point B.

The population of the PNW consists of giving and compassionate individuals. Through creating partnerships with rural and Indigenous communities, leaders have reached out to identify stakeholders to challenge the issue of traffic safety on reservation lands. Those living with disabilities, either physical or mental, may be impeded by governmental law from being considered disabled, but the ability for a neighbor to help a friend still exists in this society of good Samaritans. Those of low-income status live in a region that is heavily investing in affordable housing. Additionally, those who do not own a car must assess their own situations to determine whether owning a car might exacerbate their financial difficulties. Nonetheless, those who are disadvantaged can feel assured that they live in a region where the nondisabled and advantaged population is ready and willing to extend a hand to the least of these.

CHAPTER 3 CHARACTERISTICS OF THE MOBILITY UNDERSERVED AND DISADVANTAGED GROUPS IN THE PNW

Data from the United States Census Bureau reveal characteristics of AIAN population size in the PNW. In 2010, Idaho had a reported 36,385 individuals who identified as Native American or Native American in combination with other races. Alaska had 138,312 individuals, Oregon 109,223, and Washington had the largest number of individuals at 198,998 (“The American Indian,” 2012, 7). The Governor’s Highway Safety Association reports found that AIAN communities suffer the highest rate of mortality in traffic-related pedestrian deaths, among child and infant deaths related to fatal injury, and among DUI incidents (“An Analysis” 2021, 3-4).

The 2021 Governors Highway Safety Association report stated that AIAN and “Black infants aged <1 year had consistently higher total injury death rates than other racial/ethnic populations,” and that AIAN “children ages 1–9 and 10–19 had the highest rate of traffic death” (4). The report further revealed that AIAN communities experienced the highest rate of pedestrian related traffic incidents, with “males ages 15–24, 25–34, 35–44 and 45–54...the highest death rates were among American Indian/Alaska Native men (range: 8.13-11.72)” (3). Likewise, AIAN females were found to have the highest death rate across those same age ranges (4).

One must be familiar with the reality of a rural community to gain an understanding of why these numbers are so disheartening. Many rural communities do not have public transport, and some reservations, like that of the Coeur d’Alene reservation, have multiple facilities located between separate cities that often have a sizeable distance between them. There is also a significant lack of infrastructure within these communities that endangers pedestrian travel. Lack

of adequate sidewalks and public transportation exacerbates the traffic safety and accessibility challenges (Garretson, 2022).

Outreach and existing programs exist within the PNW that could be a model for other states in building partnerships with AIAN communities concerning traffic safety. Montana's Safe on All Roads (SOAR) program has a goal to decrease the number of Native American traffic fatalities. Although Native Americans make up 6.2 percent of the population of Montana, they are involved in 17 percent of motor vehicle-related fatalities. By providing culturally relevant messages to Tribal communities, and with the participation of Tribal stakeholders, SOAR provides a message about road safety that is culturally relevant to Native American communities ("Safe on All Roads").

Additionally, through Washington state's Target Zero program, partnerships have been forged with Native American communities to develop outreach activities aimed at encouraging community members to practice safe driving behaviors. The program includes a board that "is responsible for advising the [Washington Traffic Safety Commission] WTSC on Tribal initiatives and investments designed to reduce traffic deaths and serious injuries of Native Americans in Washington" ("Tribes").

Within the disadvantaged group of those who have both physical and mental disabilities, population characteristics can be revealed through data, again obtained from the United States Census Bureau. A 2019 report on "Disability Characteristics" estimated that the total civilian population with a disability comprised 41,089,958 individuals. Within that group those under five years old numbered less than in other age groups, with 138,659 total individuals reported. In contrast, those within the age group of 35–64 years represented 15,303,033 reported individuals with a disability. Those ages 64 to 74 years represented 7,522,485 individuals, and those over 75

represented 10,148,497 individuals. One can see that in looking at disability on a national scale, younger individuals are less affected than older ones, indicating that the progression of time and life can lead to more complications.

An estimated total of 15,797,245 persons nationally have been reported to have cognitive difficulties. Within that population, those ages 18 –64 represented an estimated 9,085,439 cases. Those ages 65 and older represented an estimated 4,357,615 cases (“Disability Characteristics,” 2019). From this, it can be understood that more young people possess a cognitive impairment than older people. Court and Givon (2003) stated that “children and adolescents with learning disabilities have social difficulties in comparison with their peers. They report feelings of loneliness, isolation, and lack of fulfillment in social situations” (50).

Isolation and loneliness have taken their toll on this country’s population, and they are something that states in the PNW are aware of. In 2017, Governor Jay Inslee of Washington state signed into law the Travis Alert Act, which requires several state first responder agencies and police

to review existing training programs both locally and nationally to design a statewide training program that will familiarize fire department and emergency medical service personnel with the techniques, procedures, and protocols for best handling situations in which people with disabilities are present at the scene of an emergency. (“Education for EMS,” 2018, 7)

Another disadvantaged group is those of low-income status, and the U.S. Census Bureau provides information that can illuminate the characteristics of this population. According to data provided in 2019, the estimated total population of those within the PNW states living below the poverty line were as follows: 71,938 individuals in Alaska, 195,984 individuals in Idaho, 131,882 individuals in Montana, 470,643 individuals in Oregon, and 730,240 individuals in Washington (“Poverty,” 2019).

The age distributions among the different states were similar, with the most individuals living below the poverty line between the ages of 18–34 years and 35–65 years. Another strongly represented group in all states was individuals who were under 18 years (“Poverty,” 2019).

Alaska is unique in that it provides a Permanent Fund Dividend (PFD) to state residents each year. In practice, it is a sort of universal income that has proved to have lifted many Alaskans out of poverty. Berman and Reamey (2016) estimated that PFDs have contributed to lifting almost 25,000 Alaskans out of poverty. The authors claimed that the “PFD program is a unique social experiment, providing a basic income—a recurring cash payment paid unconditionally—to an entire population” (p.1-2).

Those in poverty experience harsh realities. The material items that many see as necessities in their lives are luxuries to others. Many individuals cannot even afford transportation, and this is true of many in the PNW. The U.S. Census Bureau estimated that in 2019 25,042 Alaskans did not have a vehicle available at their residence. Other PNW states had similar numbers: Idaho (26,879), Montana (20,080), Oregon (127,836), and Washington (208,362) (“Selected Housing Characteristics,” 2019).

These data show that disadvantaged populations of the PNW do indeed have issues, but one can also see the outreach that communities, states, and legislation have provided to help those in need.

CHAPTER 4 OUTREACH EFFORTS

4.1 Overview

As part of this project, and to understand and to characterize the challenges of underserved populations, the research team reached out to agencies throughout the state of Idaho. Potential partners included the Tribes of Idaho, Native American student organizations, and the Idaho Commission on Aging. Communication was maintained with the Tribes of Idaho through Native American student organizations at the University of Idaho (UI) and Lewis-Clark State College (LCSC). In meetings with both student groups, students shared their perspectives and expressed interest in forming partnerships based on improving transportation safety.

One barrier in this process was finding a way to begin the conversation around potential transportation safety improvement. It was vital to have a clear message to create a partnership based on a common foundation when communicating with individual Tribes. Another essential component was adhering to the goal of sharing knowledge and fostering communication, respect, and trust. A lack of response from Native American student organizations and the Tribes of Idaho was not uncommon. Within Idaho, the National Institute for Advanced Transportation Technology (NIATT) experienced a geographic barrier as well. The Tribes of Idaho that were located within close proximity maintained robust and expanding transportation systems. Moving forward, potential options for communication include traveling to each individual Tribe or attending a conference such as the Affiliated Tribes of Northwest Indians Mid-Year Convention in May 2019.

Emails and phone calls were utilized in this process. Looking to the future, given the positive experience of in-person meetings with UI and LCSC team members, finding a way to meet in person would be the best option for forming lasting and mutually beneficial partnerships. The UI Office of Tribal Relations provided invaluable guidance throughout this process.

The project team also contacted the Idaho Commission on Aging. Moving forward, NIATT might consider contacting each of the six area agencies that form the Commission. By establishing a partnership with any one of the six area agencies, NIATT would have the potential to contribute to the Idaho Commission on Aging's goal of promoting independence and improved quality of life.

Initial communication with the general Commission determined that a barrier was establishing tangible ways that NIATT might positively contribute to older community members throughout the state of Idaho. Having a clear timeline, expectations for the community, and expectations of NIATT became instrumental in establishing trust and introducing the opportunity for lasting partnerships. In initiating communication with each of the above three groups, contacting each individual community was essential. Because of the range of factors that make each municipality unique, communication with locals from each community was imperative.

4.2 Senior Population

Serving the senior population, through the lens of public administration, is rooted in improving opportunity and providing equal accessibility. Particularly in rural communities, providing access to public services such as transportation is essential in supporting and serving this group. This is because "Rural compared to urban older adults have poorer health and nutrition, lower incomes, fewer employment opportunities, fewer transportation options, and less adequate housing" (Hash, 2015).

Guided by federal law and statutes regarding accessibility, local governments implement services that offer enrichment aimed toward equal access and improved quality of life. This may be observed through public transit and specialized parks and recreation programming. Local governments may also partner outside of the public sector or across jurisdictions to further foster programming and service provisions. Within the state of Idaho, this is practiced by a number of

localities, partnerships, and private and nonprofit organizations. Local examples and points of contact that serve the senior community include the following:

- Kootenai Metropolitan Planning Organization (KMPO)
- Selkirk Pend Oreille Transit (SPOT) and Bonners Ferry Restorium
- Moscow Parks and Recreation
- Ring-A-Ride Service
- SMART Transit.

Local government serves as one means of recognizing community issues and finding solutions. Further opportunities include communicating with retirement homes, senior veterans' services, hospital transportation, public transportation services, and city councils.

4.3 Community Members with Special Needs:

A similar issue is providing improved and equal access and opportunity to community members with special needs. Mandated by law, the ADA is implemented at the local level. However, within the state of Idaho alone, a number of county courthouses remain noncompliant (Fisher, 2018), including one located in Shoshone County. Although noncompliance in this case is due to the historic nature of several public buildings across the state, updating facilities is necessary and continues to be addressed by the responsible local government. Local examples and points of contact that serve the special needs community include the following:

- Kootenai County Paratransit
- Moscow Rebel Tigers
- SMART Transit
- Idaho School Districts.

As with serving the senior population, collaborative partnerships between local governments and public transportation are offered through both nonprofit and private entities.

Looking forward, communicating with local governments, school districts, and city councils would offer opportunities to discuss service provision for community members with special needs. Moving ahead, low-income community considerations will be added to this document.

Note that each population has distinct needs to be considered, and there is potential for community members to belong to a combination of the above-listed populations. As discussed above, local governments provide essential services for transportation and public goods.

Additional groups in the private and nonprofit sectors also contribute to service provisions.

Above all, the goal remains to be equitable, efficient, and forward thinking.

CHAPTER 5 FINDINGS FROM INTERVIEWS WITH TRIBAL REPRESENTATIVES

5.1 Summary of Major Traffic Mobility and Safety Challenges for Tribal Communities in the PNW

- Range of Issues
 - Geography and topography
 - Every Tribe is different, for example Washington state has 29 Tribes ranging from those in urbanized environments to those in very rural environments.
 - Jurisdictional issues
 - These issues are shared by both rural and urbanized Tribes. While federal law trumps state laws, there is always confusion about whether federal or state laws apply.
 - Another challenge is the land tenure issues that many Tribes face. The loss of Tribal lands, combined with the mixed ownership patterns within reservation boundaries, poses serious challenges.
 - Traffic safety issues
 - There is confusion about the jurisdiction to investigate fatal crashes that occur on the reservations or that involve Tribe members. For example, during a fatal car crash in the Yakima Nation, officers pulled up to the crash. When they found out that members of the Yakima Nation were involved, they refused to proceed with the investigation, claiming that they “didn’t have jurisdiction.” This was not true. This confusion causes major issues in crash reporting and analysis.

- For crashes in which a non-member of a Tribe causes a fatal crash on the reservation, the Tribe does not have jurisdiction over that non-member. In these cases, the Tribe may detain the driver and must call a local sheriff. Such issues make it difficult to regulate their reservation roadways because jurisdiction limits what that they can deal with.
- Roadways are poor, and there are not enough funds in the Tribes to fix them. Harsh rural, mountainous topography also makes it difficult to create safe roads.

5.2 Major Obstacles (Institutional, Behavioral, and Cultural) that Contribute to Mobility and Safety Problems

- Historical trauma, resulting in social and emotional issues, has stemmed from events such as the following:
 - Hundreds of years of bad treatment
 - Non-Indigenous people claimed the prosperous and fertile land, and Indigenous people were forced off of their land onto land with no economic opportunity.
- Hard economic times has led to difficulty finding employment and making money from the reservation.
- Alcohol and drug use issues have contributed to high fatality rates.
- Limitations in crash reporting.
 - Increased crash reporting would significantly help; it is important to collect data.
- Specific issues regarding teenagers' safety.:
 - Some Tribes have a tradition when teenagers turn 18 of collecting large sums of money, which is usually used to buy cars without proper training or driver education.

- Partying and drinking problems in communities that have the tradition of going on “Booze Cruises,” which has led to an increase in drunk driving.
- Lack of effective enforcement practices.
 - Tribes typically do not have enough staff or money for effective and comprehensive traffic safety enforcement programs. (Some Tribal members are sent to law enforcement agencies to be trained but they end up being hired in non-Tribal places with more money and resources.)
 - Lack of enforcement resources create a common belief that drivers would not be stopped even if they are speeding or DUI.
 - In small communities, such as Tribes, law enforcement staff tend to not stop people, as it is not ideal to stop family members and acquaintances.
 - There is serious tension between contracted law enforcement and Tribe members. Racism is still prevalent in law enforcement, making it difficult to work together.
 - Many Tribal members resent law enforcement because of experiences of being targeted.
 - Many Tribal members do not have insurance. This results in noncompliance tickets, which lead to larger and larger fines that drivers were unable to pay in the first place, creating a cycle of noncompliance and violations.
- Old myths: Older generations sometimes pass along false ideas about new safety measures, as expressed by one of the workshop attendees: “If you wear a seatbelt and you crash your car, you are just going to end up being stuck, then you burn up and die.”

5.3 Current Efforts in Tribal Communities to Improve Safety and Mobility

- Outreach efforts reduce impairment and speeding-related crashes. Long roads on the reservation make it easy for drivers to speed, including older generations and even those who had previously lost loved ones to traffic fatalities.
- Partnership with the state's Department of Transportation (DOT) helps improve safety. For example, a five-year partnership with the Washington Traffic Safety Commission has helped decrease fatality from double digits (>20) to two fatalities.
- The Traffic Safety Coordinator in the Tribes contributes to improving safety by
 - o Creating education and outreach items in Tribal newspapers, Tribal messaging, and focus group meetings.
 - o Mapping fatalities and serious injury locations to inform Tribal members about traffic safety hot spots.
- Education, enforcement, emergency management services, and engineering (the Four Es):
 - o Education programs, especially on impaired driving, have achieved several safety benefits. However, Tribal communities need access to more driver's education resources.
 - o Emergency medical services have improved, but more is needed, especially within rural areas. Almost 50 percent of the Tribes contract emergency medical services (EMS). Racism is prevalent as well; some EMS do not want to respond to Tribal people.
 - o Engineering services have improved, but there is not enough money to fix roads or sidewalks on reservations.

- More informed and engaged Tribal leadership has made a significant positive impact. They have important things to say regarding law-and-order code, budgets priorities, and the culture of the Tribal community.

5.4 Potential Role for Connected Vehicles and Smart Mobility for Tribal Communities: Opportunities and Barriers

5.4.1 Summary of Needs Assessment

The following are identified as major transportation safety and mobility problems and areas of need for Tribal communities:

- Lack of safe pedestrian facilities, such as sidewalks in the community, and their impact on the safety of school-aged children walking to school.
- Inefficient emergency response services.
- Issues with paratransit scheduling and reliability of service.
- Roadway maintenance issues including snow removal and clean up, especially for local rural roads.
- Lack of effective traffic enforcement, which leads to increased instances of aggressive driving, DUIs, and speeding in community roadways.
- Struggles of low-income families with no car ownership.
- Not enough driver education programs.

5.4.2 Connected-Vehicle and Smart-Mobility Opportunities for Tribal Communities

- Real-time information about roadway conditions to users.
- Smart carpooling and smart shopping.
- In-vehicle impairment detection and response.
- Mobility on demand (MOD).
- Smart paratransit.

- School bus tracker.

5.4.3 Major Barriers to Connected-Vehicle and Smart-Mobility Implementation in Tribal Communities

- Lack of adequate power and communication infrastructure to cover all areas of the reservations. The cost of expanding communication and power networks to support this new technology will be significant.
- The cost of owning and maintaining a smart phone to use the technology is relatively high—many members of the community may not be able to afford it.
- Challenges to using smart applications and smart phones, especially for the elderly.
- Privacy and safety issues in car-sharing operations.
- Lack of human resources in the community to support these technologies.

CHAPTER 6 FOCUS GROUPS FINDINGS

The stakeholders groups included the following:

- Tribal Communities: Affiliated Tribes of Northwest Indians, Tribes in Idaho (Coeur d’Alene Tribe, Nez Perce Tribe, Shoshoni Tribe), and Native American Student Associations (UI, Washington State University (WSU), LCSC, and North Idaho College),
- Low-income groups: households with no car ownership in Latah County (rural) and City of Boise (urban),
- Disabled groups: disabled action centers and veteran centers,
- Older populations: Idaho Commission on Aging, Washington State Council on Aging.

As part of the project tasks, several focus group meetings were conducted by UI and WSU project teams, with the numbers of attendees ranging from nine to 23. The focus groups covered Native American Student Associations (UI, WSU, LCSC, NIC), low-income groups (from Moscow and Boise, Idaho), disabled communities (from Boise, Idaho, and Spokane, Washington), and older populations (from Moscow and Boise, Idaho, and the Tri-Cities, Washington). Some highlights from the focus group meetings are provided in Table 6.1.

Table 6.1—Summary of Results from Focus Group Meetings

Community	Focus Group	Summary Results
Tribal Communities	Tribal General Population	They are skeptical because of a lack of infrastructure—they focus more on safety.
	Native American Student Associations	They look at smart mobility as very promising—are willing to work as ambassadors to their communities—likely not to live in the Tribe.

Community	Focus Group	Summary Results
Low-Income Groups	Rural Areas	They focus more on better transit-paratransit—shared mobility, and carpool applications.
--	Urban Areas	They are interested in MOD and better integrated transit service.
Disabled Groups	Disabled Veterans	They are most aware of technology—are most excited and see it as very promising. They have concerns about accessibility not being a major part of smart mobility.
Older Populations	Older Population	They see smart mobility for social purposes and shopping on demand—are excited about the opportunity for full mobility—have concerns about the ability to use the technology.

A GIS-based data collection tool¹ was developed as part of the project. Focus group participants were asked to share their traffic experience with the project team. Major traffic problems reported by participants included the following:

- Winter maintenance issues
- Roadway surface quality issues
- Long walks to a bus stop in inclement weather
- Paratransit delay issues.

¹<https://uidaho.maps.arcgis.com/apps/CrowdsourcingReporter/index.html?appid=a0d9806557c8458691cf0185ba71e018>

CHAPTER 7 CONCLUSIONS AND RECOMMENDATIONS

Overall, connected-vehicle and smart mobility technologies, tools, and applications will play a crucial role in improving the mobility and safety for all underserved populations. These technologies will promote the independence, safety, and well-being of the older population, enabling them to maintain active and fulfilling lifestyles as they age. Similarly, these technologies will offer a range of benefits for people with physical and mental disabilities, enhancing their independence, safety, and overall quality of life. They also have the potential to address transportation challenges, promote cultural preservation and improve access to essential services for Native American Tribes and communities. Other mobility-underserved populations, such as households with no car ownership, will have access to convenient, affordable, and sustainable transportation options that enhance mobility, connectivity, and quality of life for these underserved groups in both urban and rural communities. Examples of smart-city technologies that have the potential to assist underserved populations include the following:

1. **Adaptive Technologies and Personalized Services for People with Disabilities:** The integration of adaptive technologies with smart mobility applications, such as voice recognition, wave control, and touchscreen interfaces, in vehicles and transportation infrastructure will allow individuals with disabilities to operate vehicles and access transportation services independently. Smart mobility solutions can also be tailored to transportation services for the specific needs of individuals with disabilities, offering options such as on-demand ridesharing services equipped with wheelchair-accessible vehicles or specialized transportation services for individuals with cognitive and mental disabilities.
2. **AI-Inclusive Design:** AI-based smart mobility tools will prioritize inclusive design principles, considering the diverse needs of individuals with disabilities.

3. **Advanced Driver Assistance Systems:** Collision avoidance systems and autonomous vehicle technology can provide an added layer of safety for individuals with disabilities, reducing the risk of accidents and improving overall travel confidence.
4. **Real-Time Multimodal Trip Planning:** Smart mobility applications and tools will provide effective integration among a wide range of transportation modes. Smart mobility platforms that provide real-time information about public transportation schedules, accessibility features, and real-time travel time data will empower individuals to plan their journeys more efficiently, reducing stress and uncertainty.
5. **Enhanced Safety Features for Older Drivers:** Smart mobility technologies often include enhanced safety features such as GPS tracking, emergency assistance buttons, and driver monitoring systems, enhancing safety and security for older drivers by ensuring that EMS help is readily available.
6. **Door-to-Door Services:** On-demand transportation services and mobility service platforms will offer door-to-door services, eliminating the need for older adults to navigate crowded streets or unfamiliar areas, thereby reducing stress and anxiety associated with travel.
7. **Older Population Assistive Technologies:** Smart mobility solutions can be integrated with assistive technologies such as voice recognition, screen readers, and wearable devices, making it easier for older adults with sensory or cognitive impairments to access and use transportation services independently.
8. **Age-Friendly Infrastructure Applications and Tools:** Smart cities, mobility, and communities are increasingly implementing age-friendly infrastructure designs, such as pedestrian-friendly walkways, benches, and designated drop-off points, to make mobility

services and urban environments more accessible for older adults. AI smart mobility tools can be developed to accommodate the older population's visual acuity and cognitive limitations.

9. **On-Demand Transportation:** On-demand and ridesharing transportation services provide individuals without car ownership and other disadvantaged groups with convenient access to transportation whenever and wherever they need it. They can request rides in real time, eliminating the need to own a vehicle or rely on fixed-route public transportation schedules.

REFERENCES

- Act, F. A. S. T. "Fixing America's surface transportation act." In 114th Congress of the United States of America, Washington DC. 2015.
- Aimen, David and Anne Morris. Practical approaches for involving traditionally underserved population in transportation decision making. No. Project 8-72. 2012.
- "The American Indian and Alaska Native Population: 2010." U.S. Census Bureau. 2010 Census Briefs (2012).
- Americans with Disabilities Act policy brief series: Righting the ADA, no. 6, Defining disability in a civil rights context: The Courts' focus on extent of limitations as opposed to fair treatment and equal opportunity. National Council on Disability (NCD). February 24, 2003.
- "An Analysis of Traffic Fatalities by Race and Ethnicity." Governors Highway Safety Association, 2021, 1-22.
- Anthony, William A. "Societal rehabilitation: Changing society's attitudes toward the physically and mentally disabled." *Rehabilitation Psychology* 19, no. 3 (1972): 117-126.
- Ball, Scott. *Livable Communities for Aging Populations: Urban Design for Longevity*. 2012.
- Berman, Matthew, and Random Reamey. "How PFDs Reduce Poverty In Alaska." Institute of Social and Economic Research, University of Alaska, (2016): 1-4.
- Court, Deborah, and Sarah Givon. "Group intervention: Improving social skills of adolescents with learning disabilities." *TEACHING Exceptional Children* 36, no. 2 (2003): 50-55.
- Disability Characteristics: 2019." U.S. Census Bureau. (2019).
- Disability Rights Education and Defense Fund, "Law reform in disability rights articles and concept papers." Disability Rights Education and Defense Fund, Inc. 1981. I., A-1-50.
- Dresser, Rebecca. "Mentally disabled research subjects: the enduring policy issues." *Jama* 276, no. 1 (1996): 67-72.
- "Education for EMS - Disability Awareness Travis Alert Act." Washington State Department of Health. Office of Community Health Systems, September 2018.
<https://www.doh.wa.gov/Portals/1/Documents/Pubs/530224.pdf>.
- "Fatality Analysis Reporting System (FARS)." National Highway Traffic Safety Administration 2021. Accessed October 30, 2021. <https://www-fars.nhtsa.dot.gov/Main/index.aspx>.
- Fisher, Sharon. *Another Endangered Species: Historic Idaho Courthouses*. 2018.
<https://idahobusinessreview.com/2018/07/24/another-endangered-species-historic-idaho-courthouses/>.

Garretson, Jacob. Interview with Lindsey Holt, Coeur d'Alene Community and Tribal Member. Personal, February 4, 2022.

Governors Highway Safety Association "An Analysis of Traffic Fatalities by Race and Ethnicity." Governors Highway Safety Association, 2021, 1–22.

Hash, Kristina Michelle. *Aging in Rural Places: Policies, Programs, and Professional Practice*. 2015.

"Highway Safety Improvement Program – Idaho 2020 Annual Report." National Highway Administration, 2020. <https://safety.fhwa.dot.gov/hsip/reports/pdf/2020/id.pdf>.

"Highway Safety Plan FY 2021 Indian Nations." National Highway Administration, 2020. https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/bia_fy21_hsp.pdf.

Idaho Highway Safety Plan for fiscal year 2022

Johnson, Victoria, Graham Currie, and Janet Stanley. "Measures of disadvantage: is car ownership a good indicator?" *Social Indicators Research* 97, no. 3 (2010): 439-450.

Kleit, Rachel Garshick, and Stephen B. Page. "The changing role of public housing authorities in the affordable housing delivery system." *Housing Studies* 30, no. 4 (2015): 621-644.

"Leading Cause of Death Reports, 1999-2019." Center for Disease Control and Prevention. Accessed October 27, 2019.

Montana Department of Transportation, *Safe on All Roads*." *Safe on All Roads*, Montana Department of Transportation (MDOT). Montana Department of Transportation. Accessed February 14, 2022. <https://www.mdt.mt.gov/visionzero/plans/soar.aspx>.

"Nez Perce Tribe Strategic Transportation Safety Plan." Nez Perce Tribe Transportation Department, 2016.

Ohman, D. (1999), *Restructuring and Well-Being in the Non-Metropolitan Pacific Northwest*. *Growth and Change*, 30: 161-183. <https://doi.org/10.1111/0017-4815.00109>

Pevar, Stephen L. *The rights of Indians and tribes*. Oxford University Press, 2012.

"Poverty Status in the Past 12 Months: 2019" U.S. Census Bureau. (2019)

Prescott, Logan. Interview with Sheila Cozzie. Other. SOAR Program, July 25, 2021.

Prohaska, Patricia. Interview with Patricia Prohaska. Other, January 7, 2022.

"Safe on All Roads"

Scouras, Susan. The impact of the Americans with Disabilities Act on quality of life issues experienced by disabled professionals in the state of Washington. Gonzaga University, 2005.

“Selected Housing Characteristics: 2019.” U.S. Census Bureau. (2019).

“Strategic Transportation Safety Plan – 2016.” Kootenai Tribe of Idaho, 2016.

Slocum, Rachel. “Climate politics and race in the Pacific Northwest.” *Social Sciences* 7, no. 10 (2018): 1-25.

Tribe, Oliphant V. Suquamish Indian. “Oliphant v. Suquamish Indian Tribe.”

“Tribes.” Washington Traffic Safety Commission, January 11, 2022.
<https://wtsc.wa.gov/programs-priorities/tribes/>.

Zaferatos, Nicolas Christos. “Planning the Native American Tribal community: understanding the basis of power controlling the reservation territory.” *Journal of the American Planning Association* 64, no. 4 (1998): 395-410.