



Enhancing Road Safety for Native American Communities in the Northern Plains: A Research and Outreach Initiative for Safer Journeys

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Research Needs

The USDOT reported 3,107 deaths among the Native American population between 2017 and 2021 (NHTSA, Native American Traffic Safety Facts FARS 2017-2022). American Indians face a disproportionately high risk of traffic injuries. Nationally, motor vehicle fatalities quantify inequity effects in traffic safety, with American Indian/Alaska Native traffic deaths increasing at a 67% higher rate compared to Caucasians' crude death rates from 2012-2016 to 2021.

(WISQARS, 2024, National Center for Injury Prevention and Control, CDC.) Adult traffic death rates among the AI/AN population are nearly seven times higher than other ethnic groups (U.S. Centers for Disease Control and Prevention [CDC]).

Despite the preventable nature of traffic injuries, previous research has shown pervasive barriers to improved road safety for tribal communities, including 1) inconsistent deference for Indigenous sovereignty, 2) scarce information essential to resource access 3) limited capacity to quantify crash factors, and select effective countermeasures, 4) complex multijurisdictional project planning and implementation, 5) inability to disaggregate data in current equity tools to tribal land and service areas, and 6) limited tribal capacity to implement roadway safety programs including funding, workforce, equipment, data collection/analysis, administrative support and isolated and sporadic handling of road safety programs.

The NDSU-UGPTI respectfully advocates capacity building, enhanced data collection, and cost-effective traffic injury prevention strategies within Tribal Nations. These efforts have included collaborative field surveys to assess the impact of a primary seat belt law on Fort Berthold, which demonstrates the positive effects of complementary media and enforcement campaigns. A cross-case study into crash reporting involved site visits and interviews with four Tribal Nation inventory practices, challenges, and sample data for crash response. Findings showed crash event data recording was feasible with commitment from Tribal leaders, trustworthy partners, and stakeholder support. Subsequently, the University assisted one tribe with a crash report database entry to reinforce continuity during tribal staff turnover. NDSU-UGPTI also worked with a tribal road department to conduct a community bikability/walkability study in a UTC demonstration project. Recommendations improved vulnerable road user infrastructure, aligning with cultural values of nature and active transport modes. A project currently underway joins the NDSUUGPTI research team with the NTTAP practitioners to demonstrate the usRAP road inventory and safety planning tools in participatory technology transfer.

The project continues a commitment to safe tribal community travel, individual wellness, market connectivity, and economic success. The research and outreach aim to develop and/or refine and transfer knowledge with traffic safety planning and decision resources. The project will strengthen Northern Plains Tribal Nations' acuity to prioritize and effectively address tribal road safety. Gaining a better understanding of existing knowledge, crash events, road corridor risk, and the potential for a Safe System (FHWA 2022) approach to prevention can yield enormous benefits. Through collaboration with the Northern TTAP, commitment to workforce skill building and safety advancement promotion continues with an aim to enhance Tribal community well-being and livability. Tribal communities may be especially well-positioned to pursue the Safe System approach to road safety. Cultural community values centered on family, nature, spirituality, and respect form a strong foundation for shared responsibility and action.

Intertwining cultural distinctions with native art, storytelling, and healing can create sustained strength and commitment to protecting the community and guests on journeys through tribal lands.

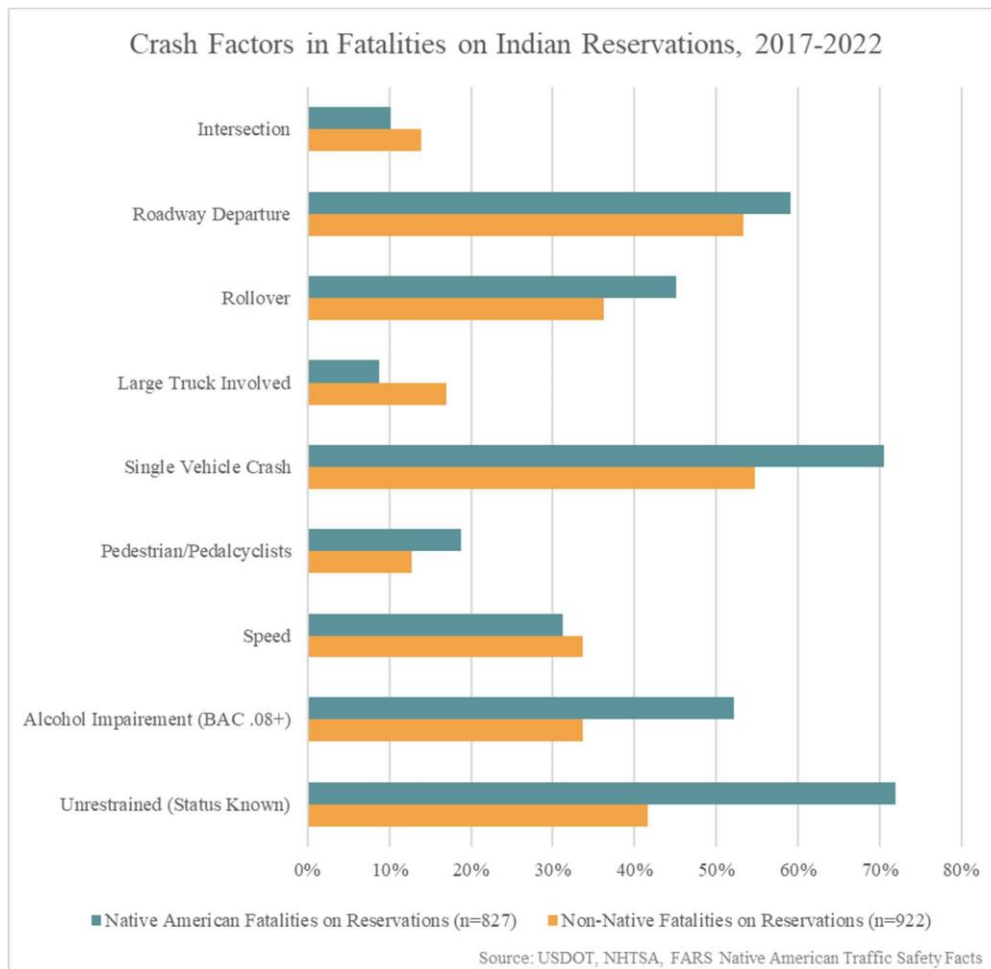


Figure 1. Tribal Nations' Fatal Crash Factors

A fundamental aspect of injury prevention is the ability to quantify the problem, enabling evidence-based interventions effectiveness. Unfortunately, widely used crash records are often limited to fatal events for Tribal Nations. One in five tribes reported they did not have a crash report form, so no standardized reporting occurs (Federal Highway Administration, 2017).

Tribes in the Northern Plains recognize traffic safety as an endemic public safety. Nationally significant issues based on fatal crash events show road departure, single-vehicle crashes, unrestrained occupants, and impaired driving as leading contributing factors (Figure 1). Tribal Nation actions include increased safety planning activities, primary seat belt laws, and crash documentation with form and oral reporting.

Research Objectives

The goal is to continue working with NTTAP, Regional LTAPS, CTIPS Partners and Transportation Research Board committees to overcome equity challenges and identify traffic

safety priorities for Tribal Nations in the Northern Plains so institutional capacity can be strengthened to ensure safe journeys on tribal lands based on proactive traffic safety planning, programs, policies, and resource decisions.

Objective 1: Engage with Tribal Communities to strengthen traffic safety information. Supporting tribal road inventory/maintenance, crash documentation, education, enforcement, and post-crash EMS response as essential foundation knowledge. Identify purposeful action to ensure continuity of agency commitment and community recognition of traffic safety as a priority through program documentation and succession strategies.

Objective 2: Support the FHWA Safe System approach. Community wellness and shared responsibility in safe journeys for members and guests are achieved through this holistic approach. Respecting traditional community wellness provides valuable context for exploring innovative and culturally attuned programs that provide agility to address local road safety priorities.

Objective 3: Recognize and recommend ways to redress equity in well-documented disadvantaged aspects of Native American Community resource access, community connectivity, and capacity building to proactively promote and sustain safe journeys on tribal lands (Figure 2).

Objective 4: Support development and implementation of research needs developed by Tribal governments, Tribal organizations, and Transportation Research Board Committee on Native American Transportation Issues regarding workforce needs, equity, and program delivery.

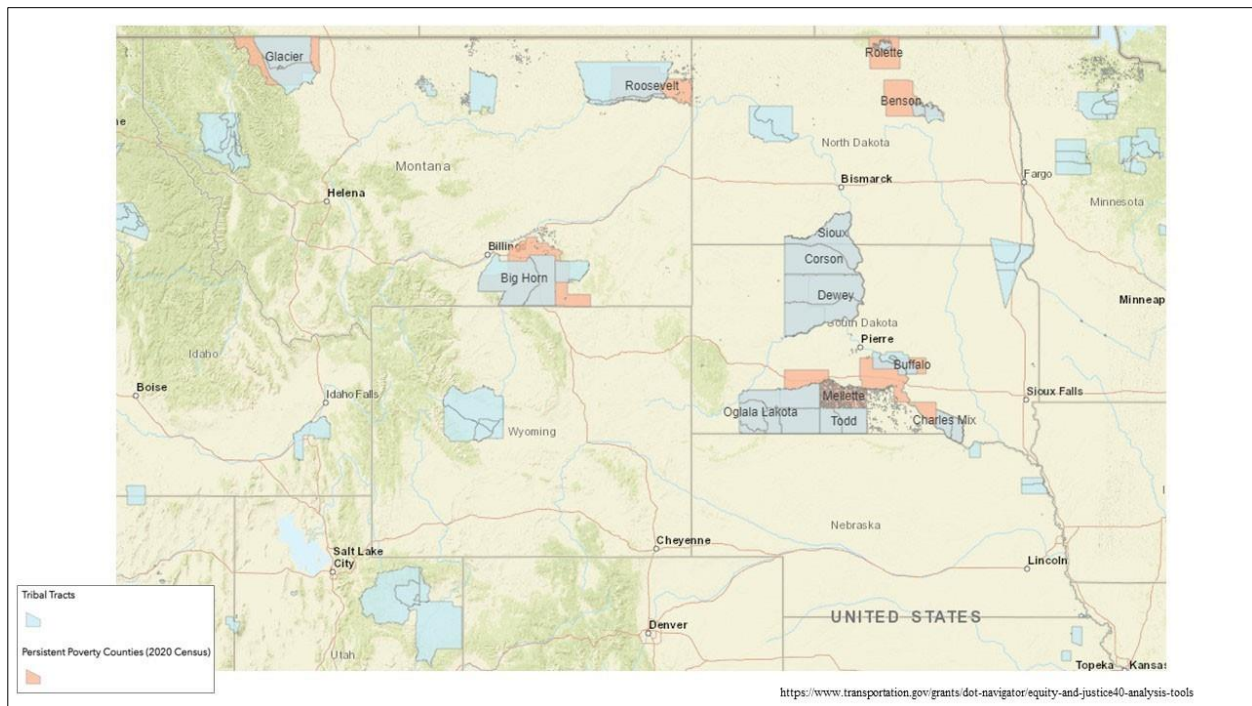


Figure 2. Historically Disadvantage Communities and Areas of Persistent Poverty

Research Methods

- Statistical and Geospatial Analysis: Used to analyze crash data, road inventory information, and demographic data to identify high-risk areas and trends.
- Case Study Investigation: Conducted on select Tribal Nations to deeply understand their specific challenges and successful interventions in road safety.
- Demonstration Project: Implementation of the Safe System approach in a pilot Tribal community to showcase its effectiveness and adaptability.
- Interview/Focus Group: Utilized to gather qualitative data from Tribal leaders, community members, and safety experts to inform culturally appropriate strategies.
- Participatory Research with Tribal Partners: Ensures that Tribal knowledge and perspectives are integrated throughout the research process, from design to implementation and evaluation.

Relevance to Strategic Goals

Safety: Improving safety is a top priority for the USDOT. *Make our transportation system safer for all people. Advance a future where transportation-related serious injuries and fatalities are eliminated* (USDOT 2023). Progress is possible by understanding and addressing crash risk; essential to this is equipping decision-makers to identify priorities and for strategic countermeasure investment in a sustained Safe System approach.

Equity: Recognizing and addressing equity is ubiquitous in the USDOT Strategic Plan. *Reduce inequities across our transportation systems and the communities they affect. Support and engage people and communities to promote safe, affordable, accessible, and multimodal access to opportunities and services while reducing transportation-related disparities, adverse community impacts, and health effects.* (USDOT 2023). Research and outreach to support and inspire Tribal Nations' work to prioritize local traffic safety issues and effectively implement strategies underpin a sustained ability to address inequities in national safe journeys resource access and allocation. Equity data and analysis tools should be developed and refined to accurately identify Tribal and American Indian/Alaska Native transportation needs and gaps.

Educational Benefits

Technology transfer resources and training materials designed for Tribal Nations. Workforce development outreach via NTTAP to ensure understanding and skills to adopt valuable technology and decision tools. Academic faculty development in stakeholder education related to research findings. Audience feedback will be solicited to refine for ongoing improvement.

Outputs through Technology Transfer

Tribal workforce support to institute new technology, asset management, and/or decision tools via NTTAP liaison. Peer knowledge-sharing with demonstration project results, project summaries, and presentations to practitioner and academic audiences to disseminate research findings. Initial workforce and technological capacity will be queried. Tribal practitioner feedback will be solicited to refine for ongoing improvement.

Expected Outcomes and Impacts

This research and technology transfer will amplify collaborative efforts to build knowledge and Tribal Nations' capacity for safety mobility for journeys in the Northern Plains. Saving lives through a Safe System approach will be the ultimate community outcome. The cultural foundation will define and strengthen each Tribal Nation's initiatives to ensure Safer Communities, Safer Journeys, Safer Speeds, Safer Vehicles, and Post-Crash Care (Figure 3, Figure 4).



Figure 3. USDOT SSA

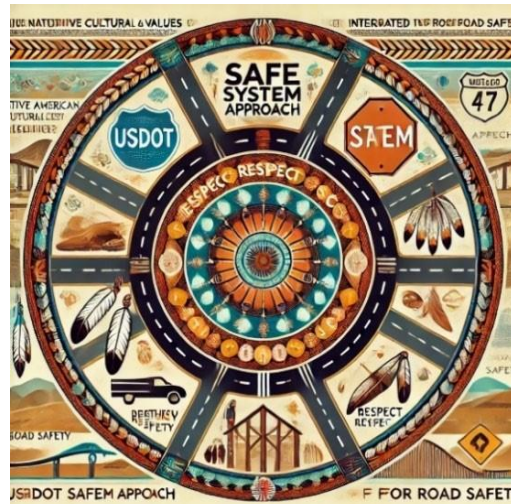


Figure 4. Native American Sample SSA, to be Updated (ChatGPT)

Work Plan

- 1) Safe System Foundation
 - a) Work with the tribes for improved and sustained information to prioritize traffic safety initiatives, strengthen decision-making, and improve resource access and allocations.
 - b) Participate in tribal transportation conference planning and delivery for Northern Plains Tribal Events and National Transportation in Indian Country Conference.
 - c) Propose tribal-led traffic safety sessions/speakers for knowledge sharing/building function during a future event, as opportunities arise, in coordination with NTTAP, Regional LTAPs, and other stakeholder groups.
- 2) Safer Journeys (Road/Active Transport)
 - a) Showcase advanced software and technologies, such as automation in recognizing 360 and LiDAR images, to evaluate road conditions using the usRAP tool. This tool evaluates road safety by providing risk maps, star ratings, and data-driven recommendations. We will identify the attributes most applicable to the tribal scenario and demonstrate their use in assessing the safety of critical corridors. This will assist tribal planners to:
 - i) Investigate primary and secondary LiDAR and low-cost traffic/asset monitoring hardware for road and traffic data collection.
 - ii) Accurately assess road infrastructure with new and existing information to identify and prioritize high-risk areas.

- iii) Utilize machine learning to provide a cost-effective data collection system from roads and surroundings.
 - iv) Make data-driven decisions to allocate resources more effectively.
 - v) Foster long-term capacity-building within Tribal road safety programs.
 - vi) Drone Applications and Demonstration (*tentative: UND companion project to collaborate; separate UND project funded out of the original UND CTIPS allocation*).
- b) Engineering applications such as road safety audits, network screening, and rural road CMF countermeasure selection. Identifying unsafe curves, curves with no advance warning signs or chevrons, unsafe pedestrian crossings with no traffic marking or advanced traffic warning signs, pedestrian and bike path planning, and low shoulder segment locations with warning signs.
 - c) Promote tribal road inventory asset management tools such as ESRI and GRIT with safety features highlighted in active/beta formats.
 - i) Support identification and inventory of minor bridge structures with spans of 8 to 20' and waterway openings of 50 square feet or larger. Promote annual condition inspection reports of these structures. Data can be entered into GRIT for future needs study purposes.
 - ii) Encourage major and minor bridge maintenance action plans, including guardrails, delineators, load posting signage when needed, deck drain maintenance, and brush control.
- 3) Safer Families (People/Communities)
- a) Information gathering for safe journey actions.
 - i) Community/Observation Survey
 - ii) Crash records
 - iii) BIA traffic-related incident reports
 - iv) Storytelling/Elders Knowledge
 - v) Focus Groups/Interviews
 - b) Demonstrate methods to identify and prioritize safe journey factors with storylines, factorial analysis, decision trees, health impact assessment, and other methods. Investigate the nature of Indian lands in the region through oral information/crash data analysis and exploration of an associated.
 - c) Culturally cognizant education resources and enforcement planning tools.
- 4) Safer Speeds (Road/Driver)
- a) Traffic speed and vehicle count/classification data collection technology and analysis.
 - b) Traffic corridor speed study demonstrations.
- 5) Safer Vehicles
- a) In-vehicle technology and education resources
 - b) High-risk vehicle classes
- 6) Post-Crash Care
- a) EMS Network Geospatial Capacity in Response Times
 - b) Critical Traffic Event Response Gap Assessment

- 7) Tribal Transportation Workforce Needs
 - a) Support TRB Committee on Native American Transportation Issues Tribal Transportation Workforce Peer Exchange.
 - b) Support implementation of the research roadmap and other research needs identified in the Tribal Transportation Workforce Peer Exchange.

Project Cost

Total Project Costs:	\$531,346
CTIPS Funds Requested:	\$265,673
Matching Funds:	\$265,673
Source of Matching Funds:	North Dakota State University – \$172,687.45 Northern TTAP – \$53,134.60 North Dakota LTAP – \$39,850.95

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