

Project Title

Local Road Safety Program Evaluation: Perceptions, Experiences & Implementation

University

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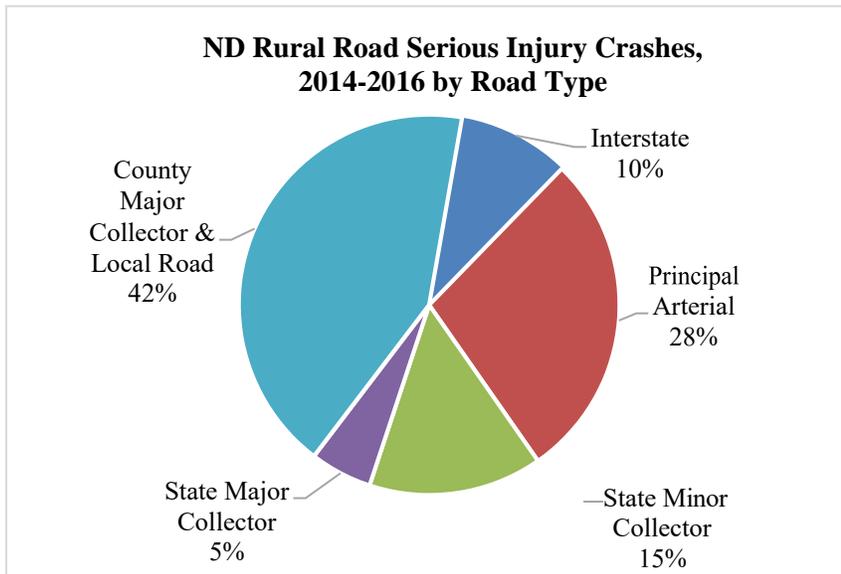
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Research Needs

Local roads are an essential to economic and social connectivity for rural regions where the population and activities are widely dispersed. Sustained efforts to ensure that people and goods can be moved safely and efficiently throughout the road network are important for attracting businesses and growing communities that enable economic growth. While high traffic corridors appropriately receive a majority of the effort to improve traffic safety, North Dakota has been successful in devising a sustained program to advance local roadway safety improvements through the LRSP. The goal is to reduce motor vehicle crash (MVC) risk by understanding the LRSP role in local road safety decisions since 2012; and how to enhance it as an SHSP strategy through greater understanding and enhancements such as a geospatial management platform.

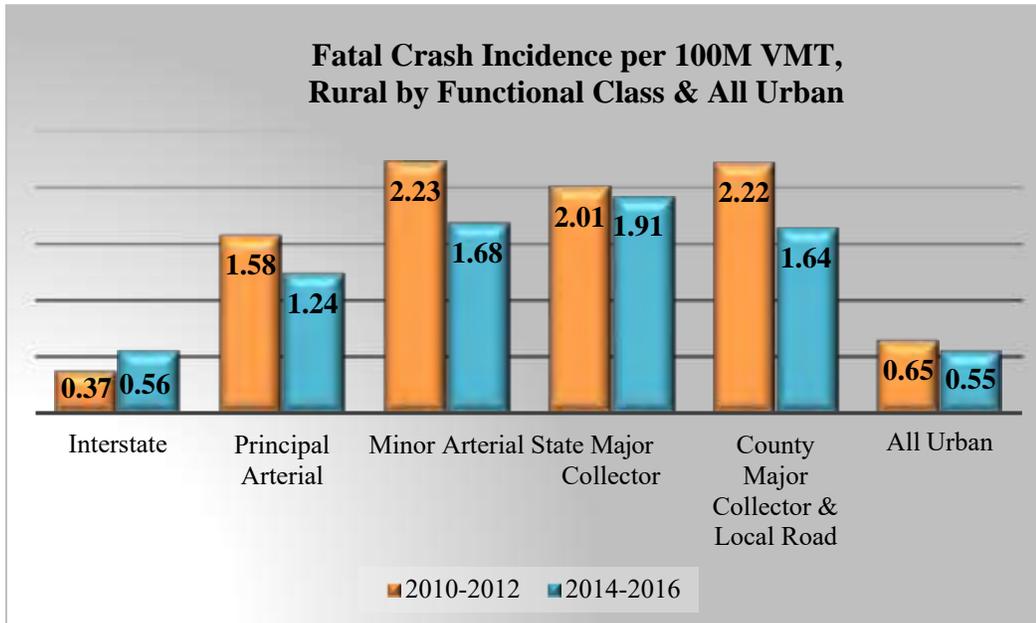
Local roads remain a priority in traffic safety for the state. Although budget reductions have created a challenge, the NDDOT continues to support local road safety investment through the Highway Safety Improvement Plan (HSIP) and the Highway Safety Plan (HSP). This work will contribute to the future efficacy of rural road safety by enhancing the understanding of how the LRSPs have been used by local road managers and planners, as well as understanding challenges and best practices that are especially important to elucidate in the light of the state's plan to revisit its SHSP. Although county-level updates to the LRSPs are not planned as a part of the state's 2017 SHSP project, some local agencies have updated their plans and

successfully implemented projects/strategies from their LRSP. Their experiences would be valuable to peers and the NDDOT as they continue to pursue efforts to improve local road safety.



The LRSP is a performance-based framework to reduce traffic crashes on roads owned by local agencies. It is generated through a partnership that engages stakeholders, agencies and communities in identifying priorities for improving traffic safety. The plan relies on quantitative analysis to guide decision-makers in selecting the most effective evidence-based strategies to address local traffic safety priorities. In North Dakota, the LRSPs relied on state crash data to describe a pattern of crash factors' frequency among key emphasis areas among AASHTO's 22 Emphasis Areas associated with driver, special user, vehicle, highway and emergency medical services goal areas (AASHTO 2005).

The NDDOT was proactive in facilitating and funding the development of road safety plans for local road agencies in the state. As a compliment to a major revision of the state's Strategic Highway Safety Plan (SHSP), LRSPs were developed for each county and federally recognized tribe in the state. The multidisciplinary and community-based communication that occurred during the local planning process was a new venture for most agencies. The county road managers and planners took the lead in coordination but a concerted effort was made to produce a 4Es approach to address road safety. Per the following figure, fatal crash incidence declined on all road types except interstates. The county major collector and local roads incident rate declined by 26% when comparing 2014-2016 to 2010-2012. Note that the slowdown in energy development has been associated with a decline in traffic during recent years, but the incidence rate does account for this by standardizing the fatal crash event metric by annual traffic exposure.



The UGPTI conducted a 2010 survey of county road managers in cooperation with the ND Association of County Engineers (Berwick, et al. 2010). While the attention to and knowledge about local road safety has advanced substantially since the survey, a few questions in the more general survey about asset characteristics and management were designed to elicit some baseline data about safety standards and implementation of safety strategies. Only 38 entities had a standard process to examine safety on their roads. A majority, 84%, did report that they received law enforcement alerts on road safety concerns related to crashes and near misses.

About two in three counties, 62%, had a program active to make roads safer through low-cost safety strategies. Responses to the questions about implementing some low-cost safety strategies showed a wide variation among counties. Results showed that 19% never used delineators on curves or rumble strips/stripes on their roadways. About one in three counties had never installed chevrons on a curve.

Only one in four consistently installed safety end caps on guardrails in their county. A common theme was the difficulty counties had with maintaining a clear right of way that is critical in sight distance. More than 80% of counties reported safety issues related to problems with sufficient sight distance; 40% reported that it is a chronic problem.

The LRSP was implemented after the 2010 survey, but it does provide a point of comparison for the low-cost safety countermeasures and planning initiatives that were commonly discussed at that time. This survey will revisit these topics to gauge progress. In addition, the survey will also capture information related to newer additions to the commonly posed local road, low-cost safety countermeasures. County road managers will be asked to provide the location of planned and/or completed traffic safety projects on their roads between 2014 and 2017. The projects will be categorized with regard to funding source and status. A project list will also be collected from the NDDOT to corroborate HSIP local road investments.

Another element, missed in the initial UGPT survey, was the perspectives of other key stakeholders involved in the LRSP process such as law enforcement, community safety groups and emergency medical personnel. FHWA guidance for local road safety plan development shows that the process begins with establishing leadership, including a champion, working group and stakeholders, to devise a priority-based plan that is to be seen as a living document (FHWA 2012). As a living document, the LRSP is expected to receive regular attention in terms of routine examination and assessment. Participants in the original 2012 LRSP processes for each of the counties and tribes will be surveyed to gain insight into their continued LRSP engagement, current traffic safety priority views, and program perspectives. To complement the HSIP project list, a HSP award list will be collected from the NDDOT to substantiate safety investments/activities for counties. Traffic citation counts and other proxies may also be collected to supplement the behavior intervention

inventory with regard to potential LRSP emphasis areas.

The proposed survey would elevate the visibility of the LRSP as the state moves forward with updating its SHSP. In addition, it creates an opportunity for safety champions in each county to re-engage with stakeholders, as needed, and to make suggestions to increase the LRSP impact on roadway safety in the state. Topics that have emerged in local road safety discussions such as gravel surface safety management and intersection lighting will be identified in discussions with the NDLTAP and a review of recent literature. The NDDOT Safety Division has agreed to contribute to the project by providing a participant contact list for those involved in the LRSP process as well as crash and citation data that may also prove useful in the evaluation. The evaluation will specifically address LRSP elements identified in a FHWA guidance document (2015):

- Champion/stakeholder engagement
- Multidisciplinary collaboration status
- Safety data → crash analysis with regard to emphasis areas
- Action inventory and perceptions considering the county LRSP vision → goals → objectives →
 - ✓ Data-driven problem identification & evidence-based countermeasures that were posed/selected/implemented.
 - ✓ Performance measures & targets compared to the LRSP baseline.

Research Objectives

- Survey road manager to gain insight into safety planning, investments and stakeholder involvement from both the infrastructure and behavioral perspectives to complement the state's planned activities to update its SHSP and Toward Zero Death strategies.
- Use survey results and other traffic data sources to assess local road safety progress and the LRSP in that space.
- Summarize best practices and stakeholder suggestions to improve the local road safety infrastructure and behavioral intervention planning and funding processes, associated with the LRSP, specifically the HSIP and HSP.
- Pursue opportunities for local road and tribal planners and stakeholders to have roundtable discussions to gather additional insight through peer exchange about the LRSP and road safety activities.
- Demonstrate safety inventory and planning layers within the GRIT or other asset management tool.
- Support state efforts to engage counties in safety project identification, HSIP/other funding opportunities and training/outreach gaps with regard to peer practices and Vision Zero/SHSP priorities.

Research Methods

The county road manager population will be surveyed. The survey will be mailed with follow-up provided by ND LTAP in encouraging participation and providing assistance with the inventory compilation. Geospatial asset management tools will be developed and tested in establishing an inventory and planning opportunities for safety investments, including type of safety investment, funding source and completion date.

Expected Outcomes

This research will contribute to an ongoing effort to improved public safety by preventing and reducing severity of rural road crashes. Results will add to the understanding of LRSP interventions that have been completed and/or planned since the LRSP was initiated in 2012. Findings from this research will be used by policymakers and program administrations to refine and strengthen the program through training and outreach. It will also create an opportunity for the NDDOT and partners to engage the local road stakeholders in discussions to promote safety investments.

Relevance to Strategic Goals

Safety: Improving public health and safety is a top priority for the USDOT.¹ Among states, progress is possible by understanding and addressing crash risk by identifying priorities based on risk and using high-quality data to optimize policy decisions and strategic countermeasure investment. Local road crashes are an emphasis area for the NDDOT – this project will provide valuable information for future policy, program refinement, asset management tools and outreach aimed at preventing teen driver crashes.

Educational Benefits

Potential to provide stakeholder education through LTAP if identified as an area of need.

Technology Transfer

The research team will work with road managers in the field to encourage survey response and disseminate results. The survey instrument will be used to collect information regarding peer practices and the spatial inventory of local safety investments over recent years. Opportunities to present the research, such as statewide and regional road manager/engineer conferences, will be pursued. The potential to engage with stakeholders in safety focus group discussions at these meetings will also be suggested. The NDDOT supports this project and will be active collaborators in encouraging increased safety planning and investment activities by local agencies. Study results will be published in a project report and supplemental summary brief. These findings will be disseminated via social media, web sites, personal communication, and journal publications.

Work Plan

- A. Conduct literature review (Month 2).
- B. Invite SME participation in a project consultation group to include NDACE, NDACo, NDDOT, DOTSC, and NDLTAP (Month 2).
- C. County road manager LRSP survey (Month 4)
 - a. Draft survey to determine scope, status and perceptions of road managers regarding roadway safety and local road safety planning activities.
 - b. Inventory infrastructure safety investments/projects, by project type, location, complete date and funding source, based on the LRSP suggested project maps for individual counties; with inquiry regarding other safety investments.
 - c. Inventory behavioral safety interventions/projects based on NDDOT Safety Division funded local enforcement and education activities.
 - d. Work with the NDDOT to develop mailing list based on the county and tribal LRSP
 - e. Present surveys to the SME group for recommendations.
 - f. Distribute final surveys.
- D. Collect Survey Response and Roadway Safety Data (Month 6)
 - a. Input survey responses,
 - i. include local roadway safety infrastructure investment inventory based on survey responses and HSIP funded projects
 - ii. Include behavioral investment in local education and enforcement HSP funded projects
 - b. Collect crash, citation, speed and traffic data to be used in understanding traffic safety trends for local roads and counties.
 - c. Investigate traffic trends in terms of traffic levels and traffic mix.

¹ https://www.transportation.gov/sites/dot.gov/files/docs/Draft%20Strategic%20Plan%20OMB%20submission%20public_comment_508.pdf

- E. Produce Safety Project Investment Summary as Visualization in GRIT or other platforms, as appropriate, and begin to explore planning applications with a county and/or tribal collaborator (Month 16)
 - a. Establish data entry protocol and analytical processes for safety infrastructure investments to be integrated in local road manager planning tool.
 - b. Complete a demonstration project to highlight the role and benefits associated with actively utilizing the safety planning tool
- F. Analyze Survey Responses to Discuss the LRSP Intervention Survey Findings (Month 12)
- G. Develop Draft Summary Report of Survey Findings and Submit to NDDOT for Review (Month 18)
- H. Finalize Draft Survey Results Summary Report (Complete)
- I. Use FMEA method to demonstrate local road safety planning tool approach prioritization for speeding based on relative crash risk on the local road system.
- J. Verify and validate NDDOT local road network information as essential in local road safety planning and funding opportunities (Al, Kim, and PhD Student)
 - a. Collect Baseline data
 - i. NDDOT GIS Hub information
 - ii. Collect UGPTI local road jurisdictional information
 - iii. Collect GRIT (incompatible) Google Map local road segment information
 - b. Prepare merged dataset at disaggregated road segment (1 mile?) and reaggregated for analysis
 - c. Visual and manual validation for consistency across sources
 - i. Identify mismatches
 - ii. Verify with NDDOT and Counties/LTAP to set 2021 baseline road segment file
 - d. Develop process for sustained validation/verification with SAS script and GIS integration in updates to the local road system in collaboration with the NDDOT
- K. Summarize county crashes (Kim, Kelly and PhD Student)
 - a. Develop script to summarize county crash types in terms of LRSP system/crash emphasis areas
 - b. County System, Crash type
 - c. Statewide, Proven Countermeasure for Crash/road type
- L. Develop beta county crash location dashboard in cooperation with the NDACE and NDDOT (Satpal, Kim, and Brad)
- M. Outreach and County Support (Kelly B, next 12-16 months)
 - a. Reach out to county road managers 'HSIP applications' with effort to capture resistance/uncertainty basis for 'inactive' counties.
 - i. Survey/Interview road managers
 - ii. Summarize challenges, resistance, etc.
 - iii. Develop plan to work with new entrants based on the 2014 LRSP and/or other local road safety assessment
 - b. Target safety strategies with outreach related to crash types. Revisit the 2014 LRSP county road system assessment and project list.
 - i. Crash Data Analysis
 - ii. Local Road Crash Dashboard

- iii. Facilitate County Collaboration for Pooled Dust Suppression, Rumble or other safety investment
 - iv. Other
 - c. Pursue venues to promote common safety practices to share best practices in promoting local road manager safety work.
 - i. NDACE
 - ii. NDACo
 - iii. VZ Annual Summit
 - d. Annual County Road Safety Award? In conjunction with NDACo, NDDOT, etc? (We can broach this together with these groups.)
 - i. Rural County
 - ii. Urban (MPO) county local roads
 - iii. Local bridge (?)
 - e. Support NDDOT efforts to Broaden Local Road Safety Program in Collaboration with LTAP and the UGPTI
 - i. Gravel Roads Safety Promotion in Resources, Trainings and Outreach
 - ii. Pilot social platform to bring county stakeholders/residents into the discussion... county commissioners, regional VZ coordinators, LE, EMS, educators, etc. with something like a periodic survey or social media portal for driver behaviors and/or high concern sites in their county (Kelly, Kim and Graduate Student)
 - iii. Other NDDOT Suggestions addressed as resources permit
- N. Finalize Project Report
- O. Present Project via TLN and other peer/stakeholder events (Project End)

Project Cost

Total Project Costs:	\$252,000
MPC Funds Requested:	\$126,000
Matching Funds:	\$126,000
Source of Matching Funds:	NDSU Uncollected Indirect Costs; UGPTI/LTAP Salary

References

- American Association of State Highway and Transportation Officials (AASHTO), 2005, AASHTO Strategic Highway Safety Plan: A Comprehensive Plan to Substantially Reduce Vehicle-Related Fatalities and Injuries on the Nation's Highways, Washington, DC.
- Berwick, Mark, Kimberly Vachal, Kurt Johnson, and Jason Baker. County Road Survey for Transportation Managers, DP-238. North Dakota State University, Fargo: Upper Great Plains Transportation Institute, 2010.
- Federal Highway Administration, 2012, Developing Safety Plans: A Manual for Local Rural Road Owners, FHWA-SA-12-017.
- Federal Highway Administration, 2015, Applying Safety Data and Analysis to Performance-Based Transportation Planning, FHWA-SA-15-089.