



# Nebraska Highway Safety Improvement Program Implementation Plan

Federal Fiscal Year 2021



**Nebraska Department Of Transportation**

**July 2020**

Data-driven allocation of Highway Safety Improvement Program (HSIP) funds helps to promote the Nebraska Department of Transportation (NDOT) strategic goals for safety by developing projects to reduce the frequency and severity of crashes on Nebraska's roads. The HSIP Implementation Plan also supports NDOT's strategic goal of Fiscal Responsibility by providing the framework for the prudent selection of projects.

This HSIP Implementation Plan is intended as an action plan document for the Nebraska Strategic Highway Safety Plan (SHSP). Towards implementing the SHSP, this document will identify safety improvements addressing each of the critical emphasis areas of the SHSP. The 2017-2021 SHSP identifies the following five critical emphasis areas:

- Increasing Safety Belt Usage
- Reducing Roadway Departure Crashes
- Reducing Impaired Driving Crashes
- Reducing Intersection Crashes
- Reducing Young Driver Crashes

NDOT will also continue to use a crash data driven analysis approach to justify the expenditures of HSIP funds. Safety projects will be identified and developed through the Department's existing HSIP process involving multi-disciplinary safety committees.

Recognizing that certain types of roadway crashes occur randomly along the length of the system, a systemic approach to project implementation will also be used. In these cases, the data may apply to the system as a whole and not to site specific projects. In addition, national research that identifies best practices and FHWA endorsements of specific practices will be referenced for justification purposes. NDOT and FHWA further recognize that the benefit-cost calculation is only one tool for justifying the use of HSIP funds. Additional factors will be considered on a case-by-case basis.

Section 1 of this document describes historical crash data and identifies safety improvement opportunities to improve Nebraska's safety performance measures.

Section 2 describes the recent history of Nebraska's HSIP program and discusses opportunities for adjusting Nebraska's HSIP funding allocation goals to improve the safety outcomes for Nebraska's available HSIP funding.

Section 3 of this document describes proposed safety countermeasure programs, strategies, and activities under this plan.

Section 4 lists the proposed projects of a one-year HSIP investment plan to implement identified countermeasures to improve the five safety performance measures.

Section 5 describes the summary of actions identified in the one-year, five-year, and long-term planning horizons.

This plan will be closely aligned with the overall Nebraska Surface Transportation Program and includes local public agency projects to address crashes on local roads. When the estimated costs of HSIP projects exceed the HSIP fund apportionments, projects will be prioritized for project delivery.

This plan does not include countermeasures that are routinely provided as part of a broader non-HSIP Federal-aid project. While this continues to be NDOT’s plan, split-funded projects using HSIP funds can be approved on a case by case basis.

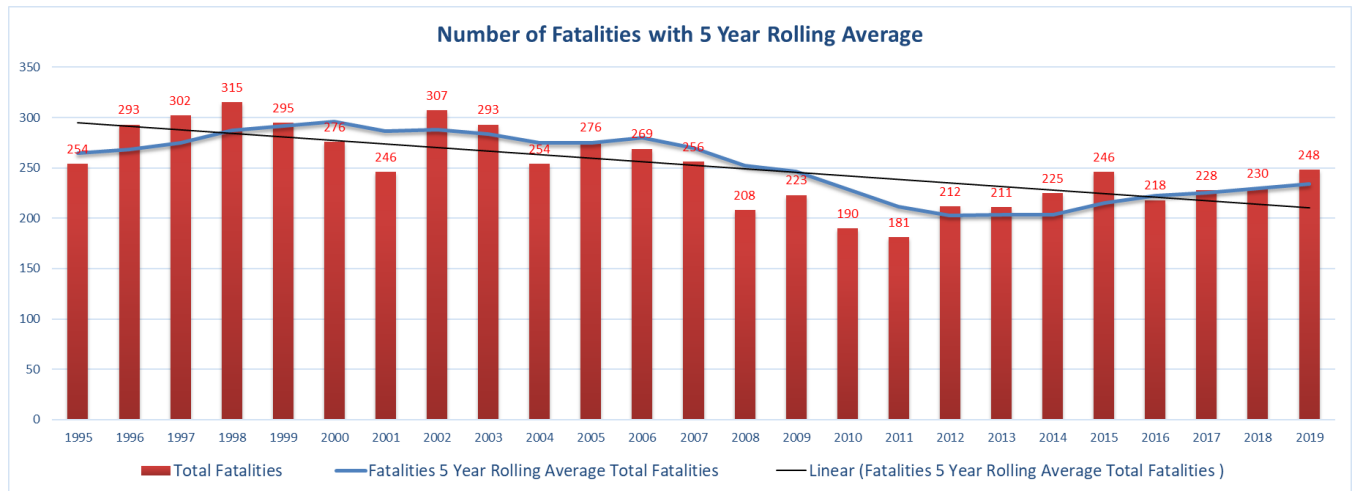
The HSIP Implementation Plan is a living, action-oriented document that NDOT plans to update annually based on follow-up studies of countermeasures, successful obligation of funding allocations, and progress on safety performance measures.

## Section 1: Historical Crash Data And Improvement Opportunities

Forecasting quality safety improvement investment strategies starts with a review of historical trends and decisions.

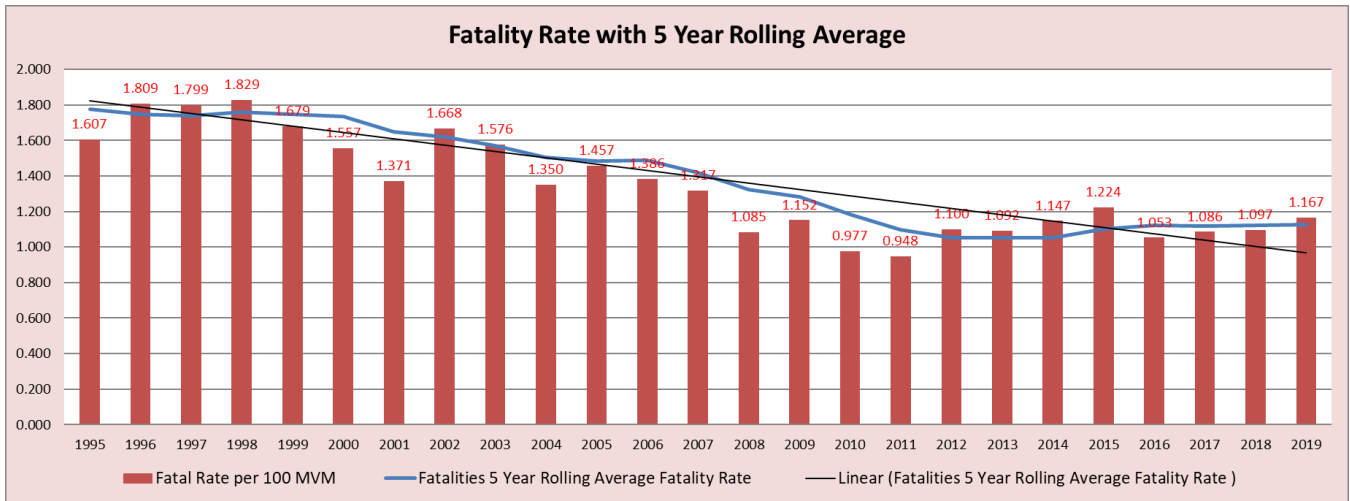
The following graphs show the 25-year history of crashes in Nebraska for each of the five safety performance measures:

- Number of Fatalities
- Fatality Rate
- Number of Serious Injuries
- Serious Injury Rate
- Number of Non-Motorized Fatalities & Serious Injuries

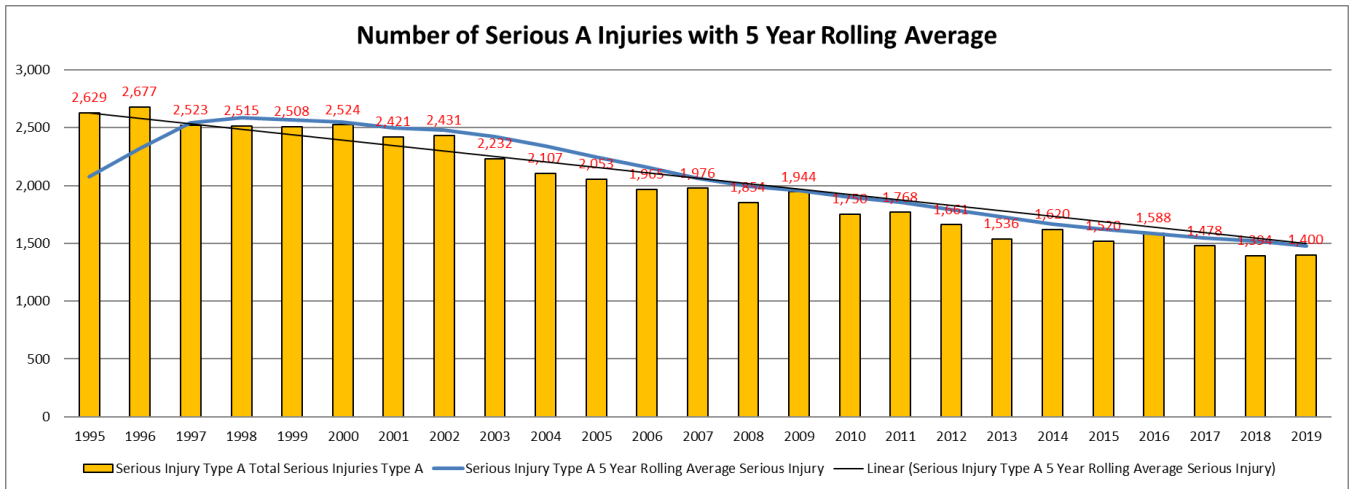


Statewide fatalities have declined slightly in the last 25 years though the 5-year rolling average has trended upward in the last 10 years.

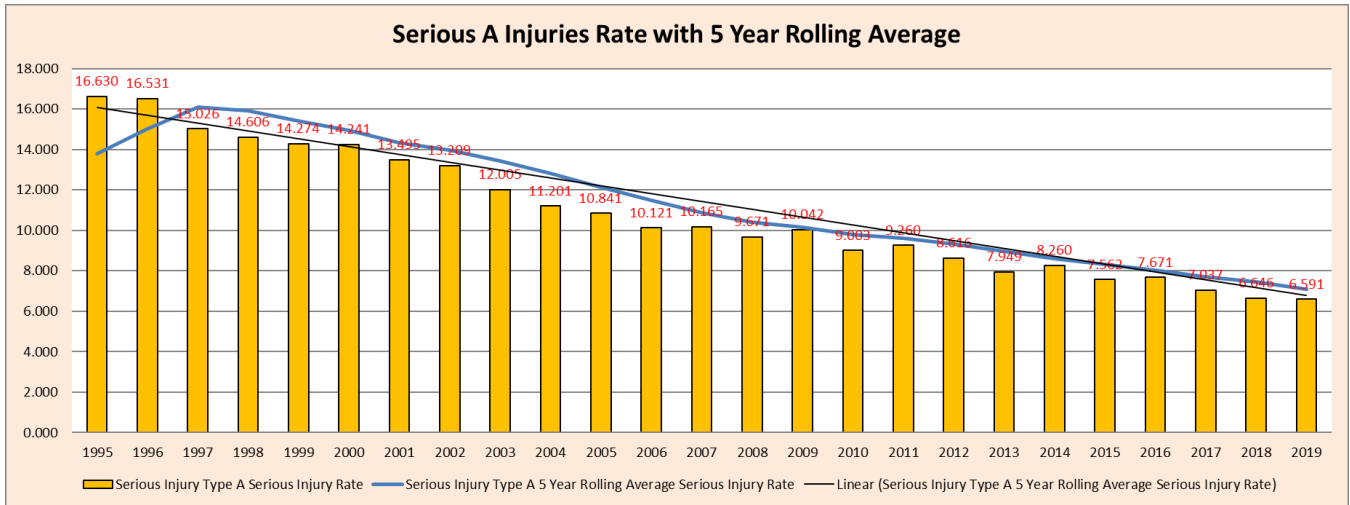




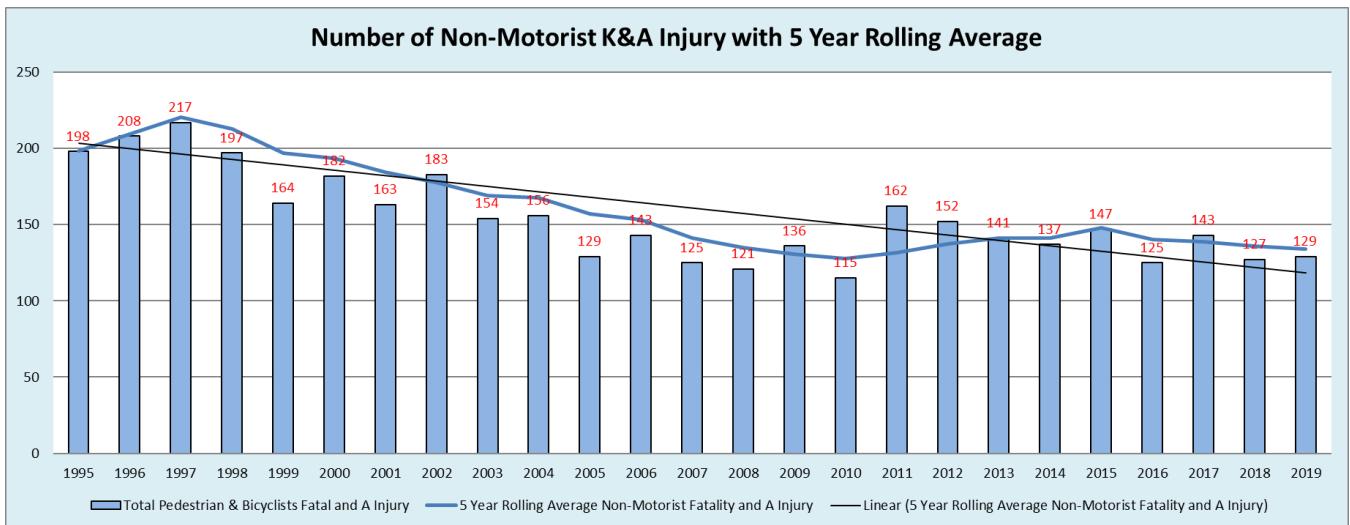
Nebraska’s fatality rate has trended steadily downward except for a plateau for the last 10 years.



Nebraska’s serious injuries have been consistently trending downward though the rate of decline has slowed in the last 5 years.



Nebraska’s serious injury rate has steadily declined for the last 25 years.

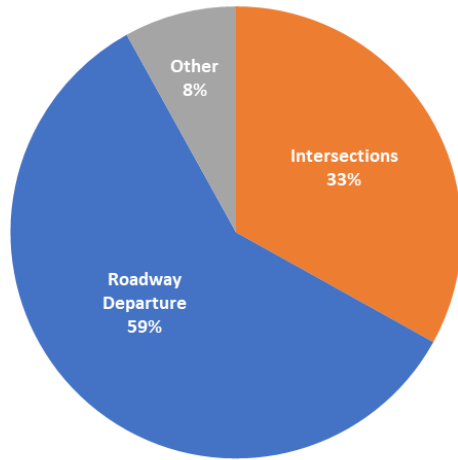


Nebraska’s non-motorized fatalities and serious injuries fluctuated up and down over the last 25 years with an overall downward trend.

Based on the trends over the last 25 years, fatalities, fatality rate, and non-motorized fatalities and serious injuries are three performance measures to focus on. A deeper crash data analysis will identify HSIP program allocation goals to focus on and countermeasure strategies to target.

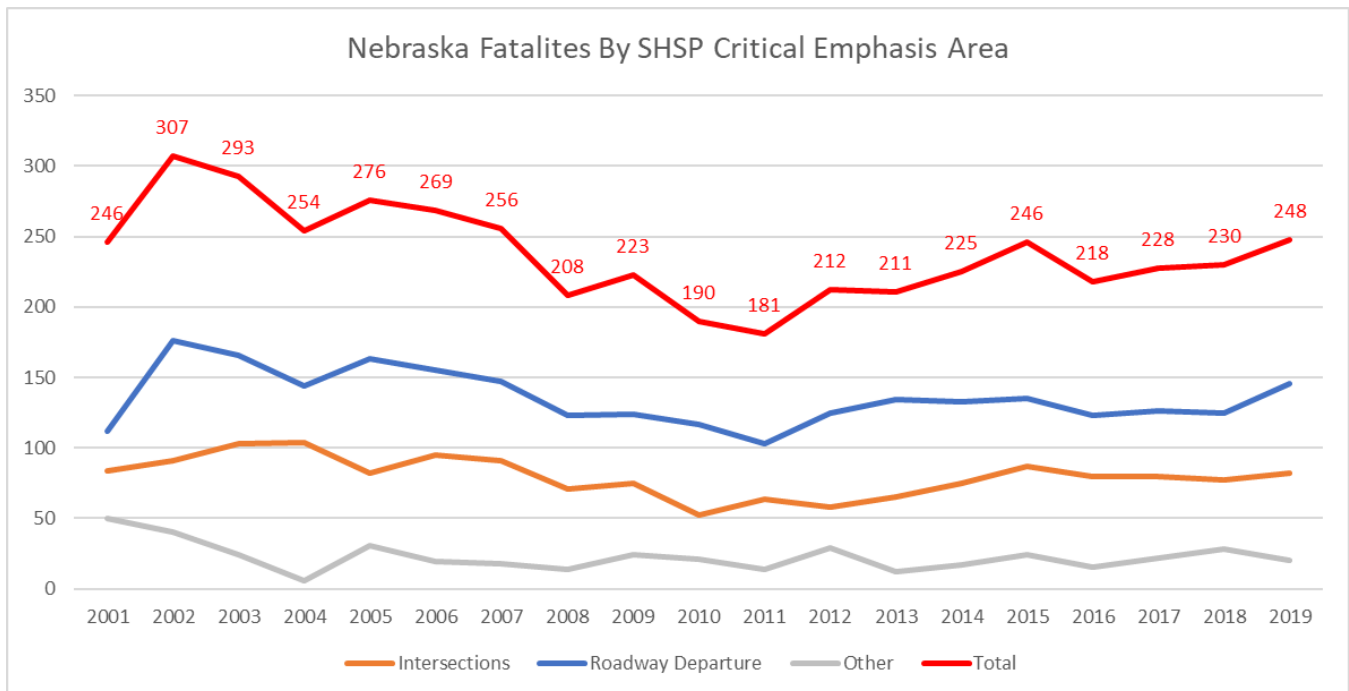
Fatalities can be separated into the SHSP Critical Emphasis Areas to identify areas of higher priority. The proportion of fatalities in each critical emphasis area indicates where to focus HSIP funding.

2019 Fatalities By SHSP Critical Emphasis Area

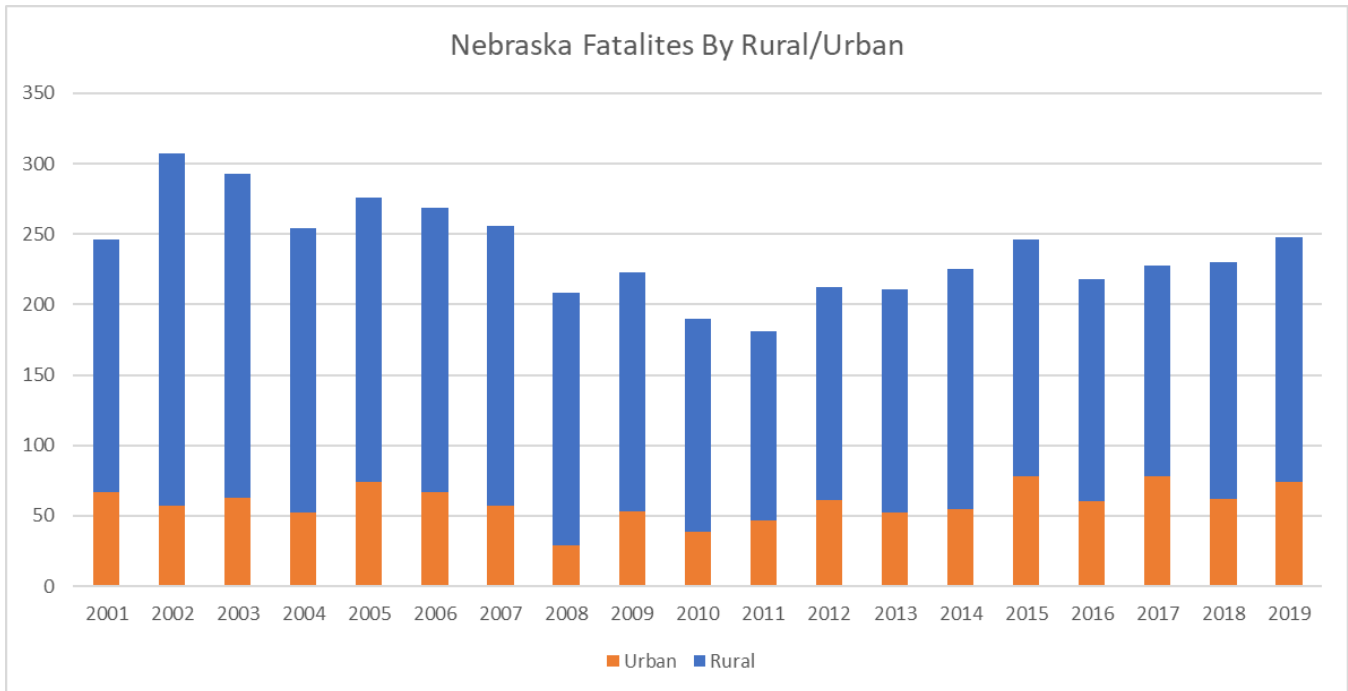


Roadway departure crashes accounted for 59% of Nebraska fatalities in 2019. 33% of fatalities occurred at intersections. The higher percentage of roadway departures crashes indicates that safety improvements should be focused on reducing roadway departures crashes more than intersection crashes.

Nebraska Fatalities By SHSP Critical Emphasis Area

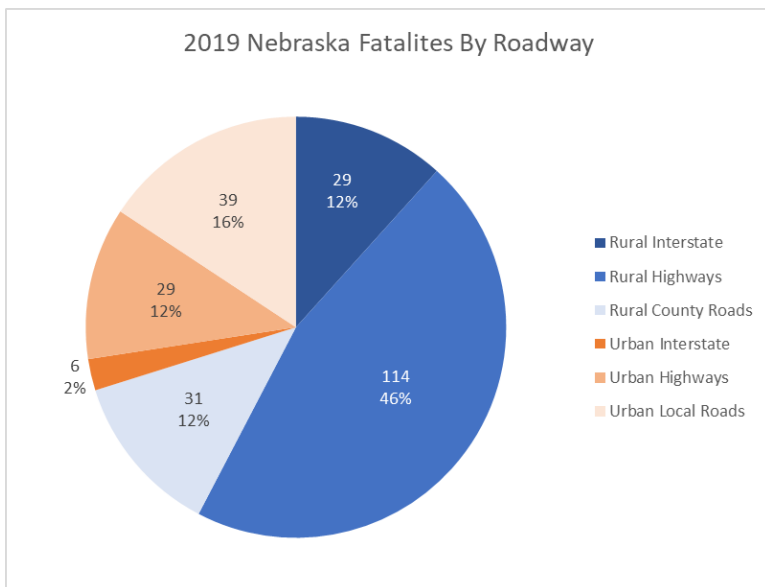


Every year since at least 2001, roadway departure crashes have accounted for more fatalities than intersection crashes. From 2001-2019, both crash types mirrored the decline then increase in total Nebraska fatalities.



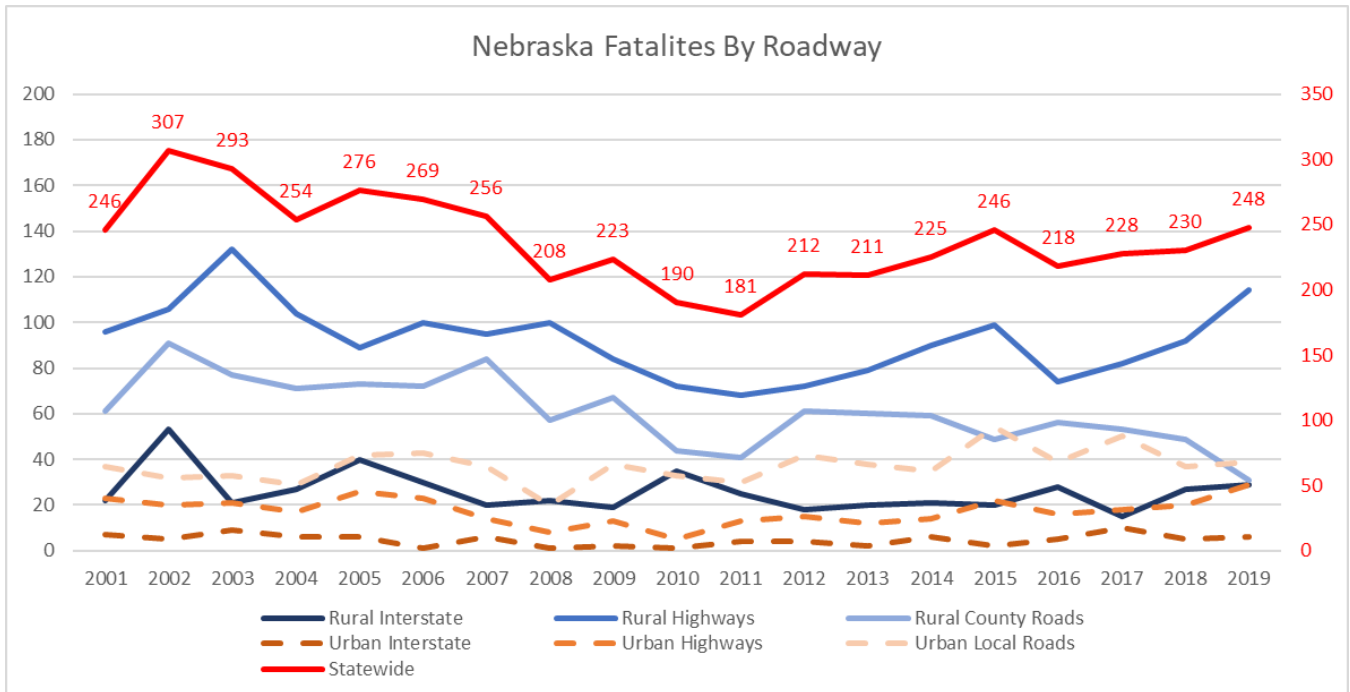
For this discussion on rural/urban fatal crashes, Nebraska defines urban as any municipality with a population of at least 1 person. This definition does not match FHWA’s definition of urban being any area with a population greater than or equal to 5,000. NDOT will be changing to FHWA’s definition of rural in 2021 when NDOT’s new crash database is in production. Using the federal definition would shift a few crashes from the urban category to the rural category. Using either definition, most fatal crashes in Nebraska are occurring on rural roads.

Breaking down the statewide fatalities by roadway type narrows the analysis focus and clarifies which roadways are driving the fatalities. The graph below shows almost half of all fatalities occur on rural highways. Similar numbers of fatalities occur on rural interstate, rural county roads, urban highways, and urban local roads though each roadway category have vastly different traffic volumes, roadway miles, and design standards.

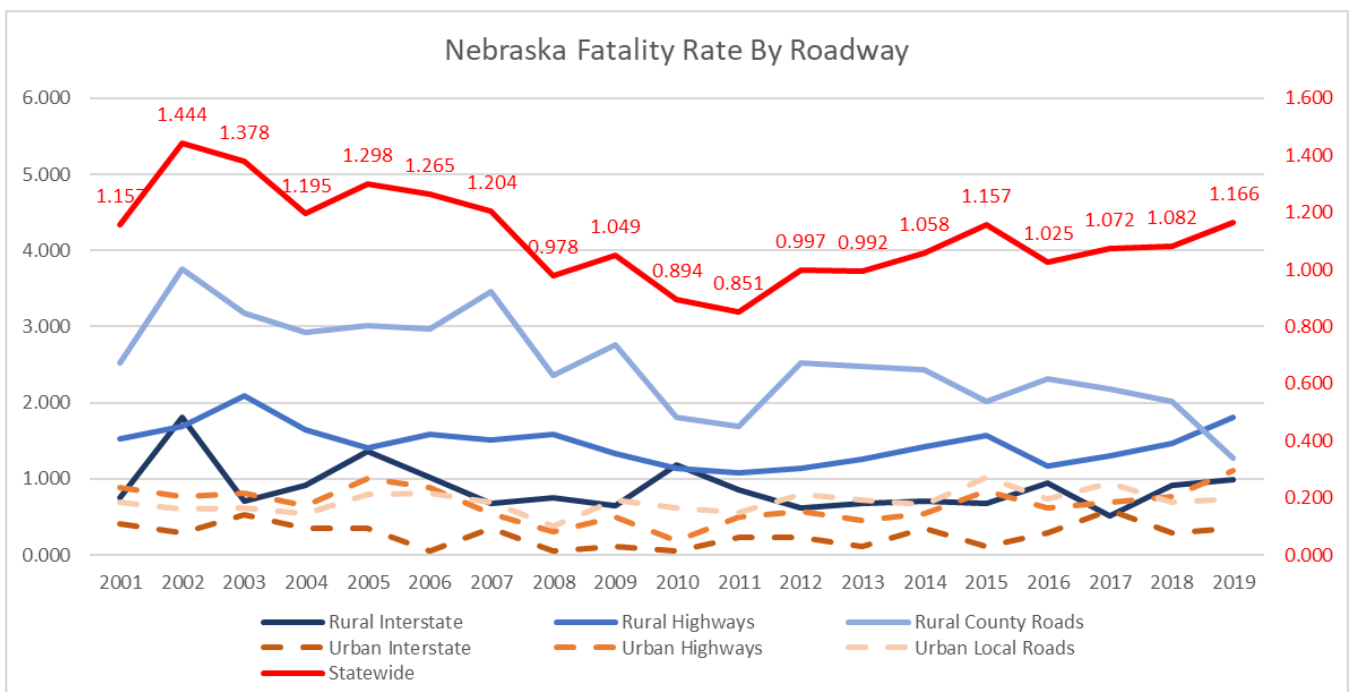


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The graph below shows the historical trend of fatalities by roadway type. The historical trends for each roadway category can be viewed from the different perspective by comparing fatality rates and fatalities per mile for each roadway type.



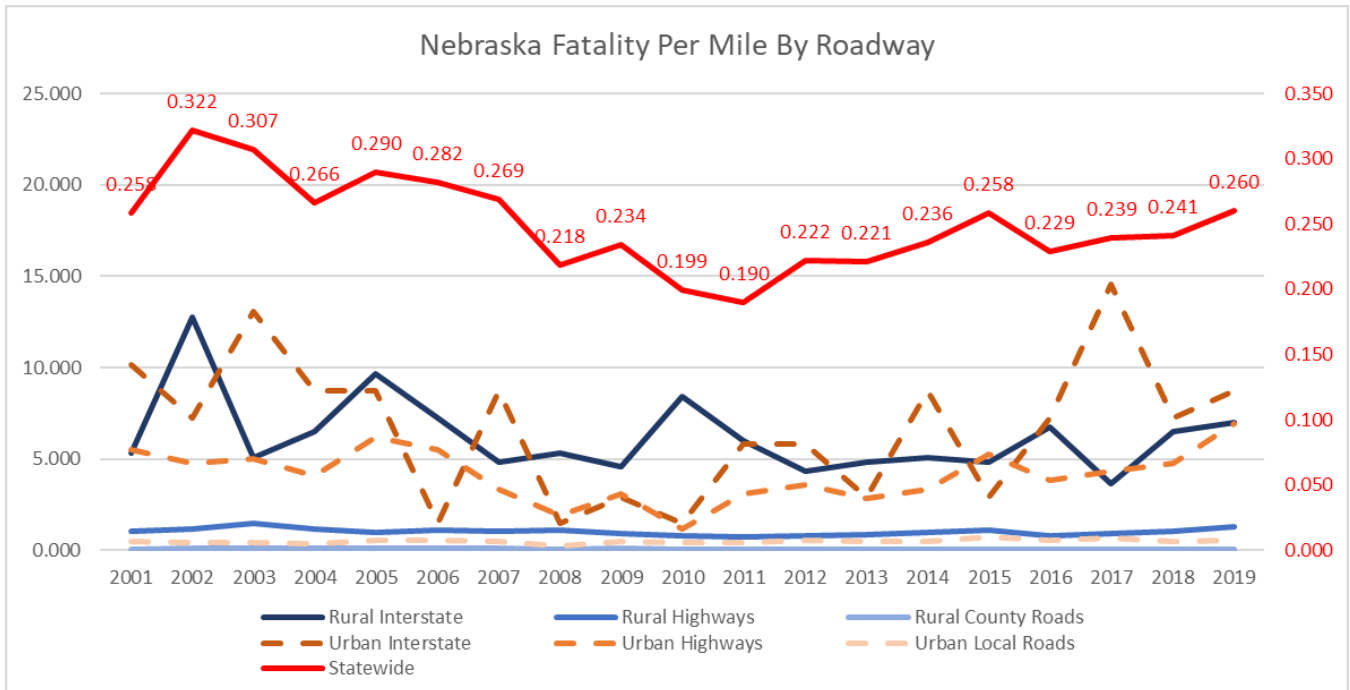
Analyzing fatality crash data by roadway type shows that most crashes occur on rural roads, with rural highways as the roadway type with the most fatalities. Rural county road fatalities are trending downward. The trend for statewide fatalities follows the downward then upward trend of fatalities on rural highways, since the rural highways have the highest proportion of fatalities.



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Rural roads have higher fatalities rates than urban roads. Also, local roads have higher fatality rates than highways or the interstate roads. The fatality rate on rural county roads has been trending steadily downward. The statewide fatality rate tends to follow the downward then upward fatality rate of rural highways.



The fatalities per mile for rural and urban interstates and urban highways are much higher than the statewide rate of fatalities per mile. The statewide fatality per mile trend followed the urban interstate and urban highway downward then upward trend.

The analysis of fatalities identified that rural county roads have been making some progress, showing a steady downward trend in fatalities and fatality rate, with more progress needed. Rural interstates, rural highways, and rural county roads were identified as safety improvement opportunities.

Rural interstates were identified as a roadway type with one of the highest number of fatalities per mile, a consistently high fatality rate, and the third highest number of fatalities. The small amount of mileage and number of fatalities makes the rural interstate a great candidate for low, moderate, or high cost per mile systemic safety improvements that target reducing fatalities.

Rural highways are the roadway type with the highest number of fatalities. Rural highways also have the second highest fatality rate. However, rural highways have the second largest number of miles to improve. This makes rural highways a good candidate for low or moderate cost per mile systemic safety improvements that target reducing fatalities.

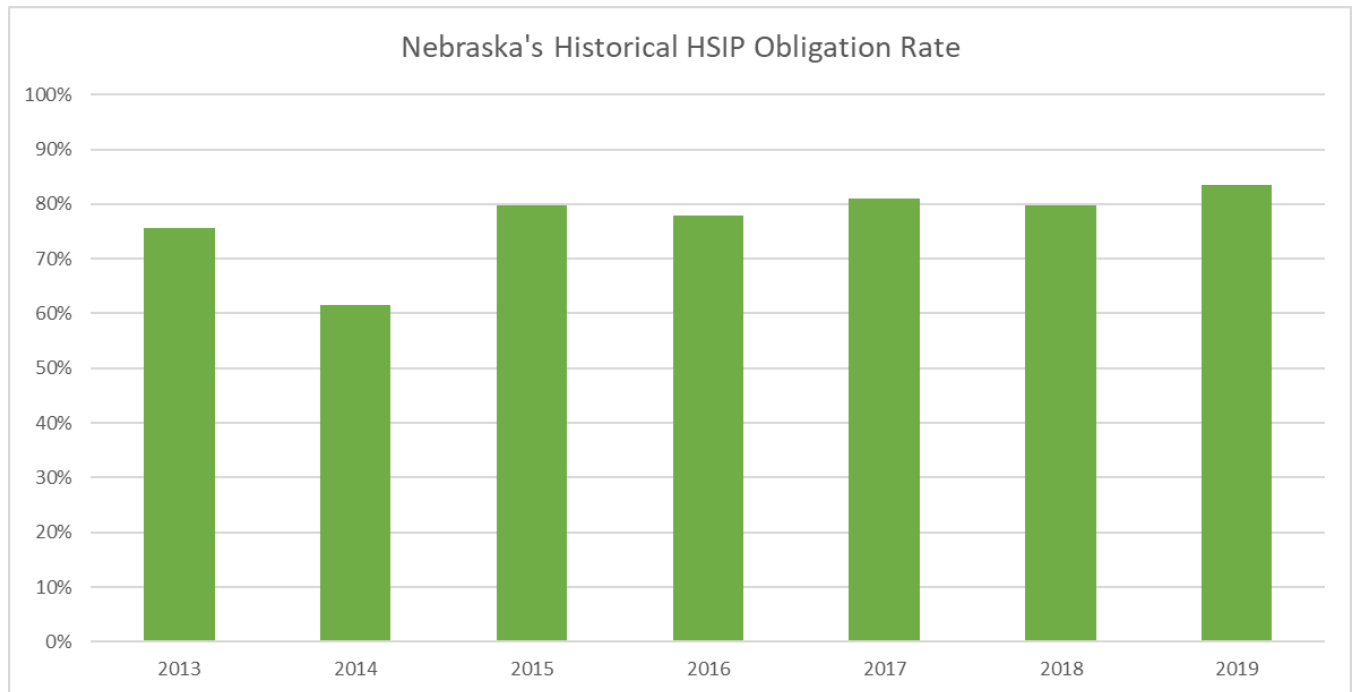
Rural county roads are the roadway type with the highest fatality rate and the second highest number of fatalities, except during significant county road flooding in 2019. Rural roads also have the most mileage by far. This makes rural county roads a good candidate for low cost per mile systemic safety improvements that target reducing fatalities.

A deeper analysis of the most common collision types, first harmful events, and contributing factors for fatal and serious injury crashes on these roadways will identify countermeasures to target for implementation.

## Section 2: HSIP Funding Allocation And Program Allocation Goals

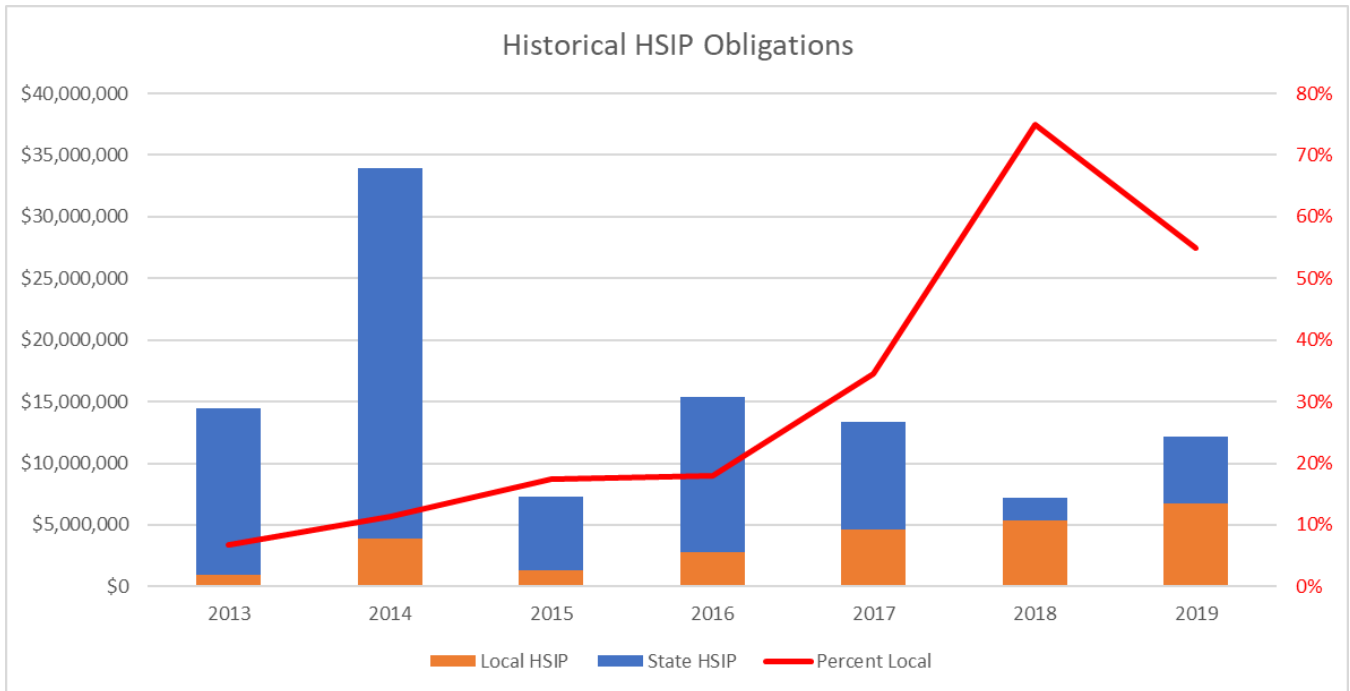
### Available Funding

Per 23 U.S.C. 148(i), States that do not meet or make significant progress towards meeting their safety performance targets must obligate HSIP funds in the amount apportioned for the year prior year to the target year only for HSIP projects. Based on the 5-year averages for 2014 to 2018, Nebraska did not meet or make significant progress towards meeting its 2018 performance targets and must obligate \$15.2M in HSIP funds in FFY 2021, per 23 U.S.C 148(i).

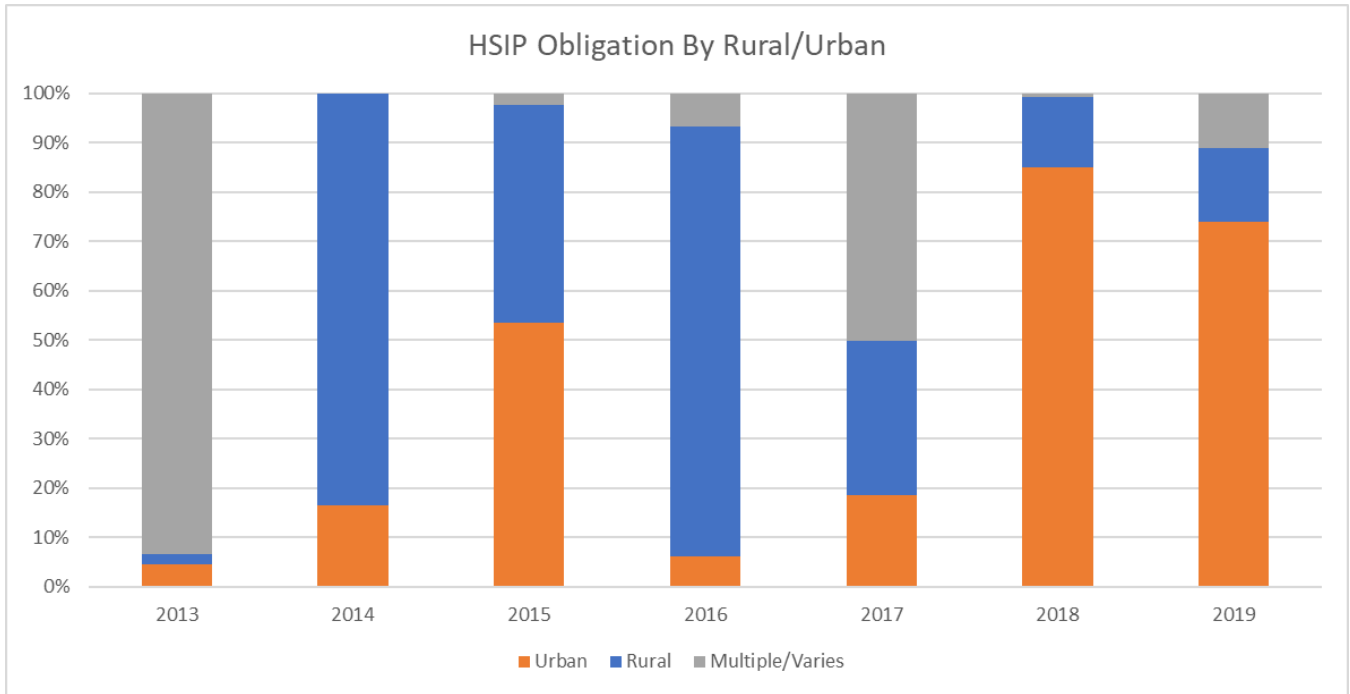


Since 2013, Nebraska has averaged an obligation rate of 77% of their cumulative HSIP apportionment each fiscal year. Because Nebraska has not been successful in obligating 100% of the available HSIP authority each year, Nebraska currently has an HSIP obligation balance of approximately \$23,274,000 prior to the addition of FFY 2021 HSIP obligation authority. The average obligation rate of 77% indicates that to successfully obligate 100% of the \$15.2M required obligation, Nebraska must program at least \$19.74M. Over-programming projects is a successful technique for having backup projects ready to obligate if one or two projects cannot be delivered for obligation in the upcoming fiscal year.

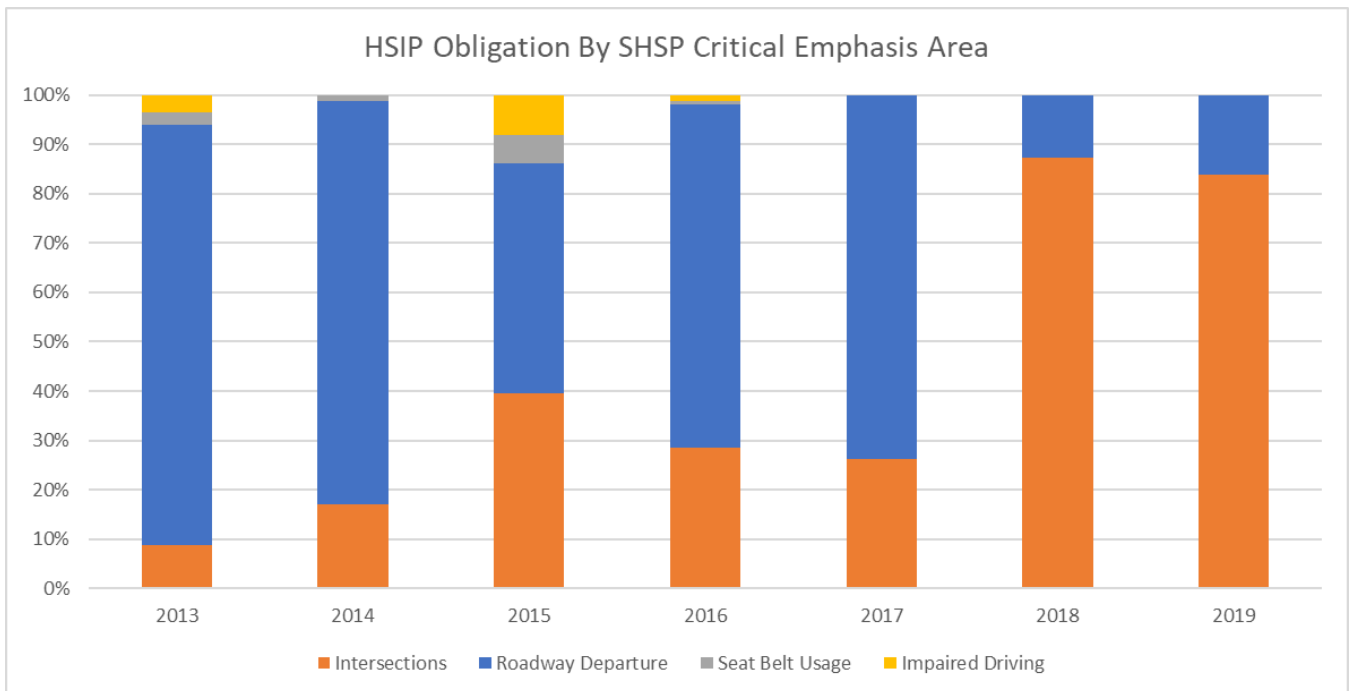
Comparing recent HSIP obligations on local-owned and state-owned roadways, more HSIP funds have been obligated to state projects than local projects, except for the last two years. The range of percentages spent on local-owned roads is likely due to NDOT's open, competitive single HSIP allocation program. All project must compete for HSIP funds based on benefit cost ratio. Some years, state projects will receive more funds; and other years, local projects will receive more funds.



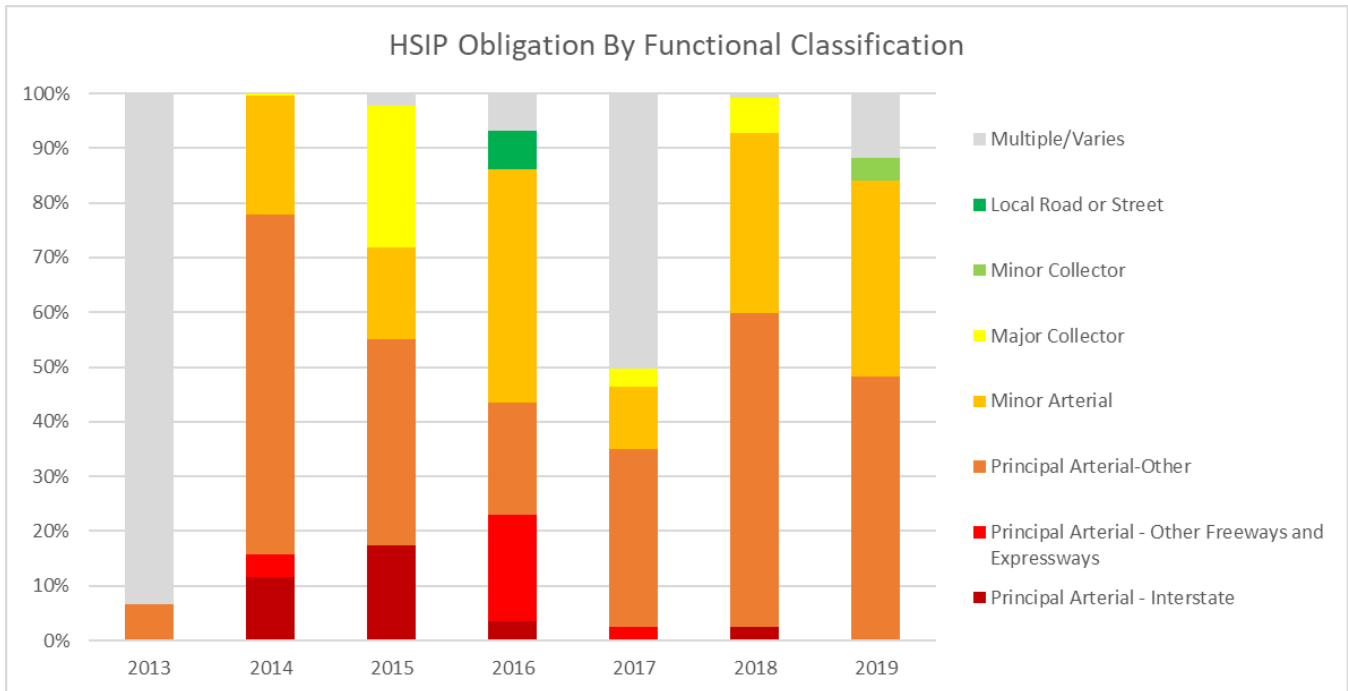
Section 1 compared fatalities by rural/urban area and by roadway type. A similar comparison of Nebraska's historical HSIP obligations would illustrate if Nebraska's HSIP program allocations have been matching the crash data trends.



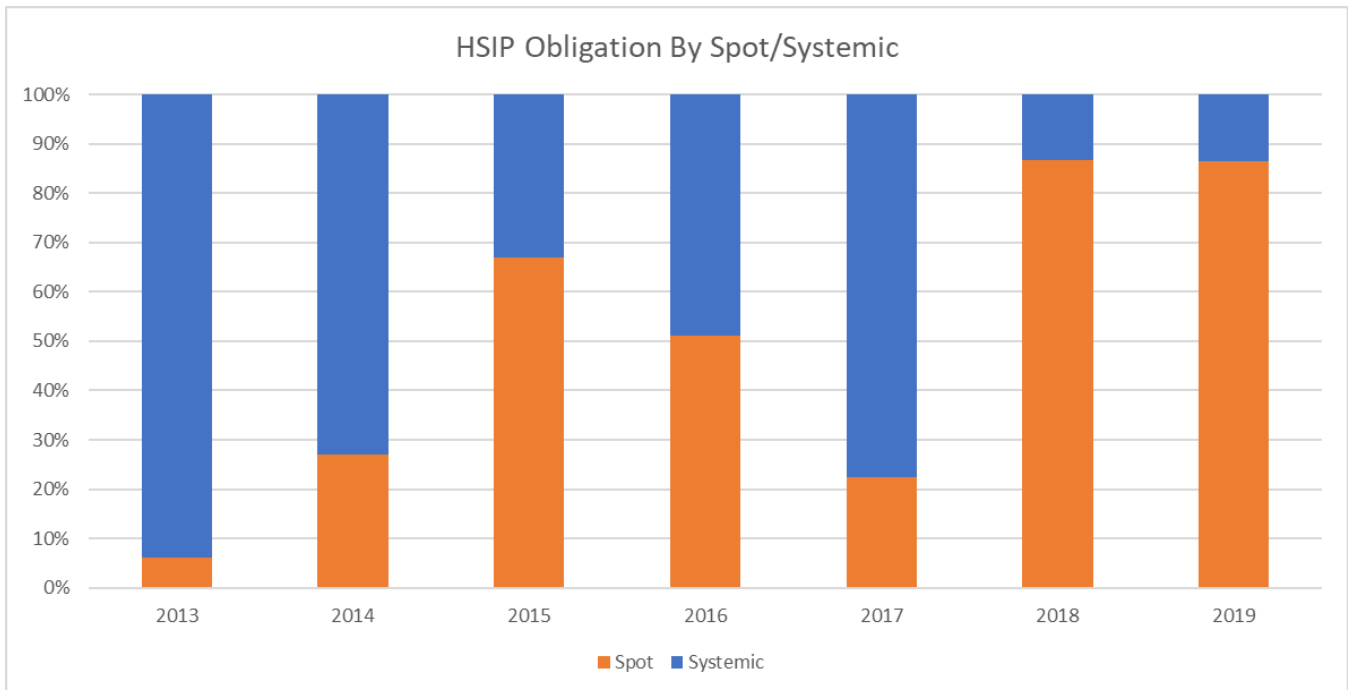
HSIP funding by rural/urban area type has varied significantly with more funding going to projects in urban areas for the last two years. The recent trend of more urban projects contrasts with crash data showing the fatalities occurring mostly in rural areas.



Since 2013, most of the HSIP funding has been obligated for projects to reduce roadway departures crashes. These obligations match the trend in crash data showing 59% of fatal crashes are roadway departure crashes. However, in the last two years, intersection improvement projects have been the focus of HSIP funds.



A review of historical HSIP obligations by functional classification shows that HSIP funds has been supporting safety improvements primarily on Principal Arterial – Other roadways and Minor Arterials.



Between 2013 and 2019, Nebraska has averaged a 50/50 split of HSIP funding between hot spot and systemic projects. The systemic approach addresses widely dispersed crashes. Rural roads have been identified as a target area type for safety improvement. The many miles of rural roads and widely dispersed crashes

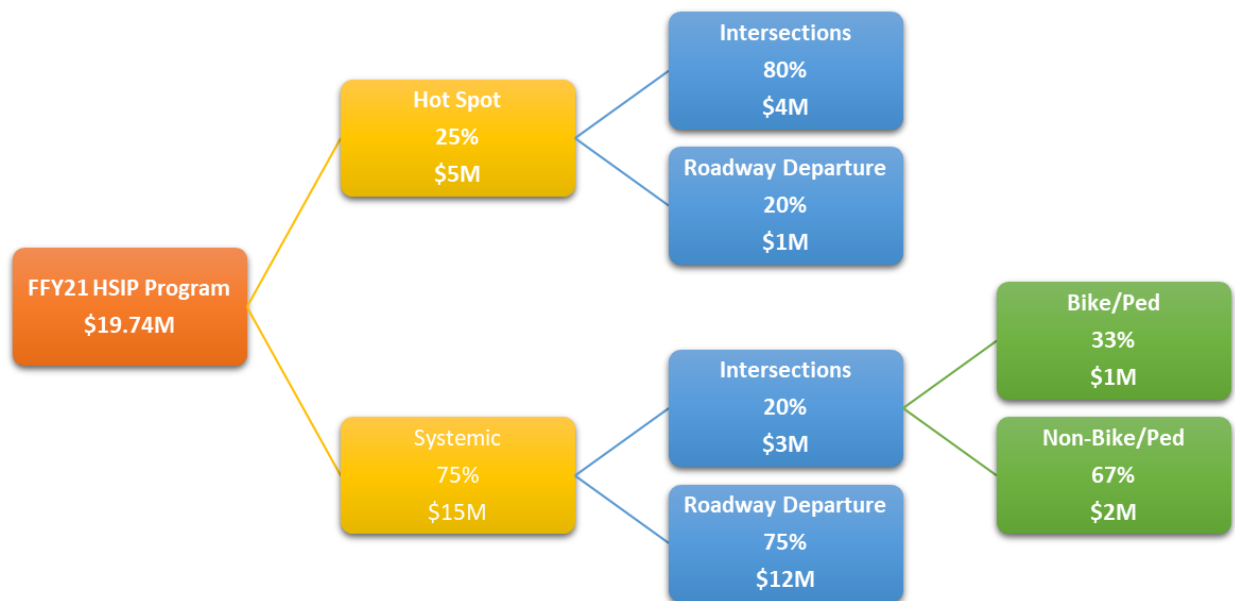
fundamentally makes implementation of successful safety improvements difficult using hot spot analysis techniques. NDOT plans to shift to more systemic projects to address roadway departure crashes on rural roads.

Fatalities due to roadway departures can be reduced by keeping vehicles on the roadway, reduce the opportunity for crashes if vehicles leave the roadway, and reduce the severity of crashes that do occur when vehicles leave the roadway.

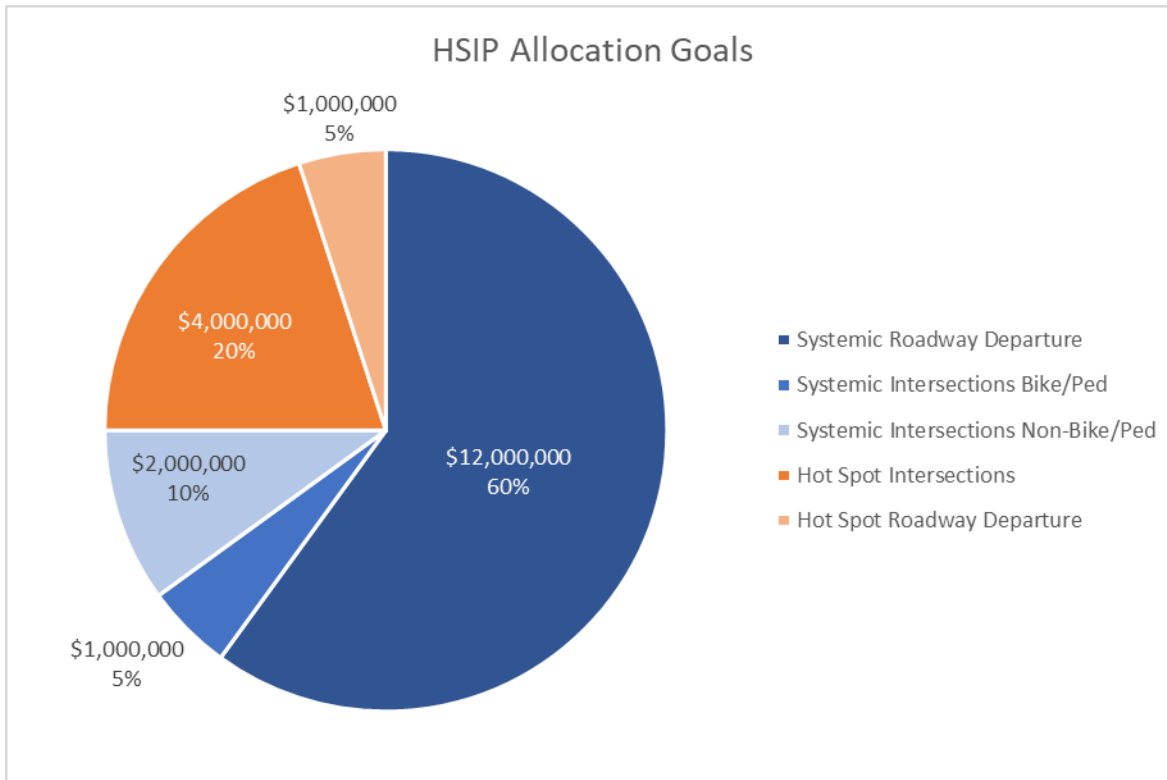
Nebraska has previously implemented statewide shoulder rumble strip projects, statewide centerline rumble strip projects, and statewide pavement marking projects to help keep vehicles on the roadway. The next phase is to implement projects to reduce the opportunity for a crash and reduce the severity of the crash if the vehicle leaves the roadway.

Based on the review of crash data trends and historical HSIP obligations, NDOT has devised the following HSIP funding allocations goals. The structure of the goals leverages funds toward more systemic safety improvement projects. Split of funding between intersections and roadway departures is intended to mirror the percent of fatalities in each critical emphasis area.

### Funding Allocation Goals



The systemic intersections funding goal was further split to specifically identify HSIP funding for systemic intersection safety improvements for bicyclists and pedestrians. While bicyclists and pedestrians are not a critical emphasis area in Nebraska’s SHSP, one of the five safety performance measures is non-motorized fatalities and serious injuries. Some HSIP funding should be dedicated to improving that performance measure.



## Section 3: Safety Countermeasure Programs, Strategies, And Activities

Nebraska’s HSIP funds are allocated in a single program with open, competitive selection based on benefit-cost and funding availability. State and local projects compete together. No separation of funding by government ownership, functional classification, NDOT district, specific countermeasures, or crash severity occurs.

The open, competitive, and benefit-cost based selection and prioritization method ensures the greatest benefit to the traveling public and largest reduction in severe crashes. However, municipalities or jurisdictions with limited or no safety analysis capabilities must rely on consultants or state personnel to identify competitive safety improvement projects.

Nebraska uses the Rate Quality Control Method to identify hazardous locations on the state highway system. This computerized procedure, called the Hazardous Location Analysis, integrates crash, traffic, and highway information to produce a series of reports that list and prioritize selected sites.

The Rate Quality Control Method involves the use of a statistical test to determine whether the crash rate at a location is significantly higher than a predetermined average rate for locations with similar characteristics. The statistical tests assume that traffic crash occurrences approximate the Poisson distribution.

Four types of highway segments – simple intersections, complex intersections, clusters, and sections -- are analyzed. Intersections are defined as the junction of a state highway (including spurs and links) with another roadway where the annual average daily traffic data is available. Clusters are floating spot locations where three

or more crashes occur within a selected cluster length, usually one-tenth mile in rural areas and one-twentieth mile in urban areas. Clusters often occur at the intersection of a state highway with another road but can also include non-intersection locations. Sections are longer segments of road with similar characteristics, varying in length, located between defined termini. The minimum section length is 0.11 miles. A section terminates when a change occurs in land use (urban or rural), number of lanes, roadway surface type, or when a state, county, city, or district boundary line is reached.

Highway number and reference post are the common data elements used to tie together information from the crash, traffic volume, and roadway data files for use in the Hazardous Location Analysis computer process. From roadway data, each type of highway segment -- intersection, cluster, or section -- is divided into nine groups by highway type and/or lane characteristics -- six-lane interstate, four-lane interstate, freeway, expressway, other 4-lane, 2-lane with surfaced shoulder (minimum 6-foot surfaced shoulder), 2-lane without surfaced shoulder, 2-lane combined, and one-way. These segments are also divided into two groups by land use -- rural and urban, resulting in a total of seventeen categories. Traffic volume and crash data are combined from the other files, with highway number and reference post as the key, and used to compute statewide average crash rates for each of these categories. Every site is then analyzed by comparing its individual crash rate to the statewide average rate for the category into which it falls.

Those locations where the crash rate exceeds the comparable statewide average rate are considered significant locations. All significant locations are prioritized by severity. Using a severity index derived from Nebraska crash experience and national data on the societal cost of crashes, a value representing the average dollar loss per collision is assigned to each crash type. These costs are totaled for each significant location, with the totals used to rank the locations. The higher-ranking locations are identified for further analysis including development of a crash diagram.

The crash diagrams are brought to one of the three safety committees for review and consideration for safety countermeasures. The three safety committees are the Highway Safety Committee, the Strategic Safety Infrastructure Projects team, and the High-Risk Rural Roads team. The Strategic Safety Infrastructure Projects team makes HSIP program policy decisions and has approval authority over any projects requesting HSIP funds above \$1 million. The Highway Safety Committee is composed of municipal, county, and MPO stakeholders and can approve project requesting funds under \$1 million. The High-Risk Rural Roads team focuses on identifying safety improvement projects for high risk rural roads.

If viable safety countermeasures are identified at a committee meeting, a benefit cost analysis is conducted and brought to the same safety committee for approval and programming of a project. Projects must meet SHSP critical emphasis areas and meet a minimum benefit-cost. NDOT recently increased the minimum benefit cost ratio from 2.0 to 5.0 to prioritize projects with a greater return on investment.



The following list identifies proposed safety countermeasures for possible implementation with HSIP funds. The cost for implementing each of these safety countermeasures varies greatly based on the roadway conditions and context.

1. **Pavement Widening On Rural Roadways.** Widening pavements that are narrower in width than the recommended minimum has been proven to reduce roadway departure crashes. In accordance with NDOT policy, this would include constructing beveled edges to facilitate the re-entry of vehicles to the roadway.

Typical projects may include widening the pavement and shoulders beyond that width required by the 3R Minimum Design Standards. These projects may also include constructing appurtenances (e.g., roadside safety hardware, grading, culvert extensions, etc.) made necessary by this widening.

Widening of shoulders at horizontal curves helps with vehicle off tracking and are a cost-effective way to reduce roadway departure crashes.

2. **Statewide Systemic Projects.** Several countermeasures proven to reduce crashes can be implemented on a statewide basis, providing a systemic solution. These projects may include the following:

- a. Statewide rumble strips
- b. Statewide rumble stripes
- c. Statewide roadside safety hardware
- d. Statewide bridge rail
- e. Statewide cable median barriers on interstates and freeways

3. **Surfaced Shoulder Construction To Enable Placement Of Shoulder Rumble Strips On Rural Roadways.** Shoulder rumble strips are a proven countermeasure for roadway departure crashes. In many places around the state, the shoulders were in a condition that prevented the installation of shoulder rumble strips during the statewide installation projects. In other locations, the surfaced shoulders or rumble strips have deteriorated to the point where the rumble strips are no longer an effective countermeasure.

Typical projects may include:

- a. Reconstructing existing surfaced shoulders where the existing surfaced shoulders are too distressed to have rumble strips installed
- b. Widening existing twenty-four foot wide roadways to twenty-eight foot wide; sufficient to define two foot wide surfaced shoulders for installation of rumble stripes
- c. Widening existing surfaced shoulders to six feet or greater; sufficient to construct standard rumble strips and accommodate non-motorized traffic
- d. Constructing new surfaced shoulders to six feet or greater; sufficient to construct standard rumble strips and accommodate non-motorized traffic

- 4. Flattening The Foreslopes And Widening The Safety Section To Reconstruction Standards On The Interstate With Resurfacing, Restoration, Or Rehabilitation (3R) Type Projects.** Large portions of the Interstate system were originally constructed with 1:4 foreslopes on both the median and outside slopes. In addition, the outside foreslopes were originally constructed to a 30 foot wide horizontal clear zone. The intent of the design standard for Interstate 3R-type projects is to perpetuate the cross section to which the roadways were initially constructed or reconstructed. Therefore, the re-grading to a 1:6 or flatter foreslope, widening of the surfaced shoulder, and expansion of the clear zone to 35 feet to meet current New and Reconstruction standards of the Nebraska Minimum Design Standards is eligible for HSIP funding.

NDOT and FHWA recognize that roadway departure crashes on the Interstate system can be mitigated by flattening foreslopes and extending the clear zone. However, the occurrences and locations of roadway departure crashes tend to be random. This requires a systemic approach to mitigating such crashes.

Typical projects may include flattening of foreslopes, widening of surfaced shoulders, and extending horizontal clear zones as well as the appurtenant culvert work on 3R type projects.

- 5. Installing, Upgrading, And/Or Replacing Signing And Durable Pavement Markings.** Improving the retro-reflectivity of overhead and ground mounted signing and improving permanent striping has been proven to mitigate driver confusion and consequently to reduce the frequency of crashes. Improvements shall be in accordance with standards in the “Manual on Uniform Traffic Control Devices for Streets and Highways” (MUTCD) and the Nebraska supplement thereto.

Typical projects may include:

- a. Replacing or upgrading guide signs and, if necessary, the sign structure
- b. Replacing existing pavement markings with durable and retro-reflective markings
- c. Replacing existing pavement markings with wider markings
- d. Replacing or upgrading regulatory, warning, and guide signs to a higher grade retro-reflective sign sheeting
- e. Replacing and/or installing object markers and delineators
- f. Data gathering and software for sign inventories to better manage sign replacement needs.

- 6. Installing Intelligent Transportation System (ITS) Elements.** Installing ITS elements has been proven to reduce driver confusion and thereby reduce crashes by providing traveler information, managing the flow of traffic, and mitigating inclement-weather road conditions.

Typical projects may include:

- a. Dynamic message signs
- b. Safety rest area kiosks
- c. Anti-icing systems
- d. Automated gates

- 7. Constructing Complete Safety Rest Area Facilities Including Truck Parking Facilities.** Interstate safety rest areas are proven countermeasures for roadway departure crashes associated with fatigue. Truck-involved crashes also have a higher degree of severity. Both the Federal Motor Carrier Safety Administration and FHWA have sponsored studies that indicate the need for safety rest area facilities and the safety benefit to the public of such facilities.

Typical projects may include constructing safety rest areas with appropriately sized rest room facilities as well an appropriate number of car and truck parking stalls.

- 8. Adding Truck Parking At Existing Safety Rest Areas.** National studies have indicated that there is a safety benefit to providing public parking stalls to allow truck drivers to get their required rest. There are many existing safety rest areas that do not provide enough stalls, but that are in good condition and would not otherwise be reconstructed in the near future.

Typical projects include adding pull-through truck parking stalls to existing safety rest area facilities.

- 9. Placing High Friction Surface Treatments.** Placing high friction surface treatments on curves, bridges, or steep grades is a proven countermeasure to reduce roadway departure crashes, particularly under wet and icy road conditions. In some instances, this approach may be used in lieu of anti-icing systems.

Typical projects include placing high friction surface treatments at select locations.

- 10. Constructing Left-Turn Lanes In Lieu Of Fly-By Lanes.** Fly-by lanes are no longer considered to be state-of-the-practice. While it is acceptable in some instances to leave fly-by lanes in place, these should typically be reconfigured as left-turn lanes. This will improve driver visibility and reduce potential crashes.

A typical project would include converting fly-by lanes to left-turn lanes.

- 11. Rural Offset Right-Turn Lanes.** Right-turn lanes at high-speed, rural, non-signalized intersections have exhibited a history of severe right-angle crashes that occur when a through vehicle is “shadowed” by a vehicle turning right. An offset configuration of a right-turn lane is a proven crash mitigation strategy. Warranted right-turn lanes will generally be reconstructed as offset right-turn lanes as part of a project, unless costs are prohibitive and there is no record of a crash history problem.

A typical project would include converting standard right-turn lanes to offset right-turn lanes.

- 12. Improving The Horizontal And Vertical Alignment of Rural Roadways On 3R Projects To Attain The Recommended Values For Design Speed.** In conformance with TRB Special Report 214 “Designing Safer Roads,” NDOT generally does not correct horizontal or vertical curvature on 3R projects. In general, signing is provided consistent with the MUTCD to warn or advise drivers of non-standard alignments. In some instances, even though crash data does not substantiate reconstructing the horizontal or vertical alignment, improving an alignment may be prudent based on potential crashes.

Typical projects may include reconstructing sections of roadway to improve the horizontal and/or vertical alignment.

**13. Non-Infrastructure HSIP Safety Projects.** Non-infrastructure projects are used to augment government safety initiatives and for workforce development related to transportation safety.

Typical projects may include projects such as:

- a. Work zone traffic control device packages for local governments
- b. Traffic control device packages for emergency responders
- c. Workforce development e.g. safety conferences, training materials, and safety related manuals and publications.
- d. Traffic Incident Management (TIM) training and the establishment of TIM groups along Nebraska's interstate, freeway, and expressway corridors.

**14. Intersection Improvement Projects.** These types of projects improve the operation and safety of intersections by means of geometric modifications, widening, installing or modifying signals, or reconstruction.

Typical projects may include:

- a. Adding auxiliary lanes
- b. Lane widening
- c. Constructing or modifying medians
- d. Improving radii
- e. Installing or modifying traffic signals
- f. Installing flashing warning beacons and signs at intersections or crosswalks
- g. Installing overhead lighting
- h. Realigning approach roadways
- i. Constructing alternative intersection designs, such as, but not limited to
  - i. Roundabouts
  - ii. Median u-turns and restricted crossing u-turns (RCUTs)
  - iii. Displaced left-turn intersections
  - iv. Diverging diamond interchanges (DDIs)
  - v. Continuous flow modified left-turn movements.

**15. Urban Roadway Corridor Safety Improvement Projects.** These projects improve the operation and safety of urban roadways on a corridor wide basis.

Typical projects may include:

- a. Roadway diet/reconfiguration (e.g. converting 4-lanes to 3-lanes, complete streets)
- b. Overhead roadway lighting
- c. Adaptive signal control technology (ASCT).

**16. Local Road Safety Plans And Road Safety Assessments (RSAs).** Local road safety plans are designed to build on the foundation established by the SHSP. These plans will provide the basis for systemic implementation of safety measures across a jurisdiction. Local jurisdictions will have the flexibility to leverage the road safety plan to meet their specific needs. RSAs are formal safety performance evaluations of existing or future roads or intersections by an independent, multidisciplinary team. RSAs report on potential road safety issues and identify opportunities for improvements.

A typical project may include funding the assessment and preparation of the subsequent report.

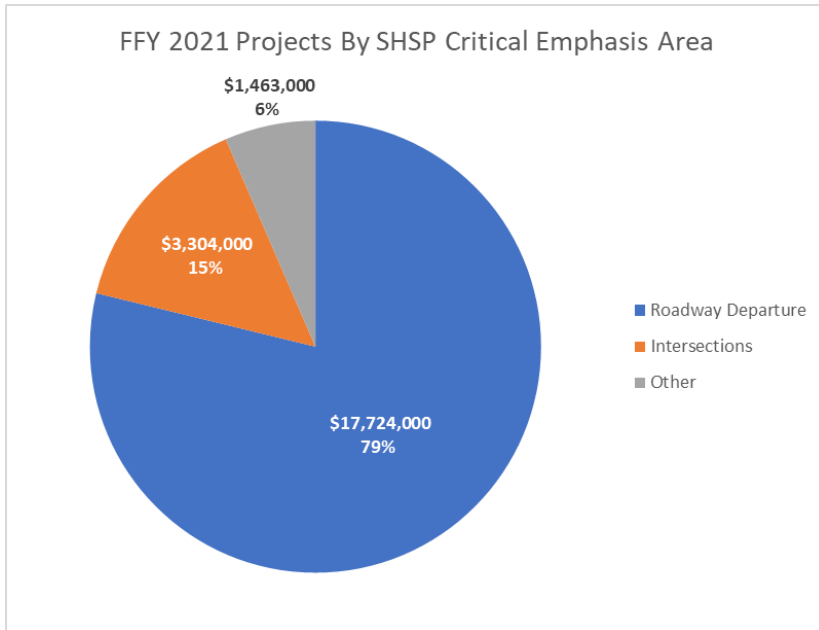
**17. Improving Data Systems Necessary For Data-Driven Safety Analysis And To Implement HSIP Performance Measures.** Data driven safety analysis is important to promoting the integration of safety performance into highway safety decisions. Improving safety data systems will enhance capabilities in safety management and project development and may result in fewer fatal and serious injury crashes.

Typical projects may supplement funding initiatives such as a web-based automatic collision diagramming system, predictive safety analysis and performance software, or the collection and storage of required data.

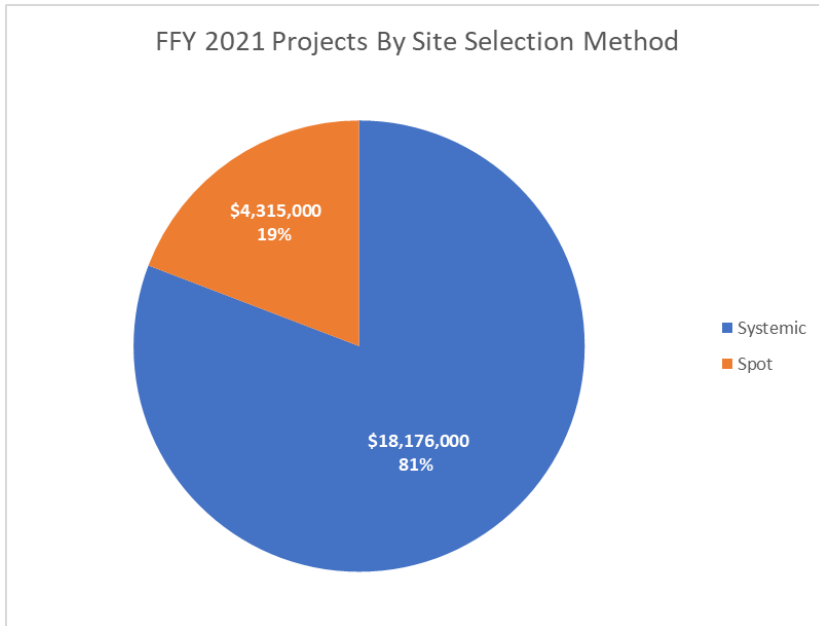
## Section 4: One-Year Project List

Based on the review of crash data, the HSIP allocation funding goals, and identified safety countermeasures, NDOT has selected safety improvement projects for Federal Fiscal Year 2021 that will improve Nebraska's safety performance measures. These projects are listed in Appendix A.

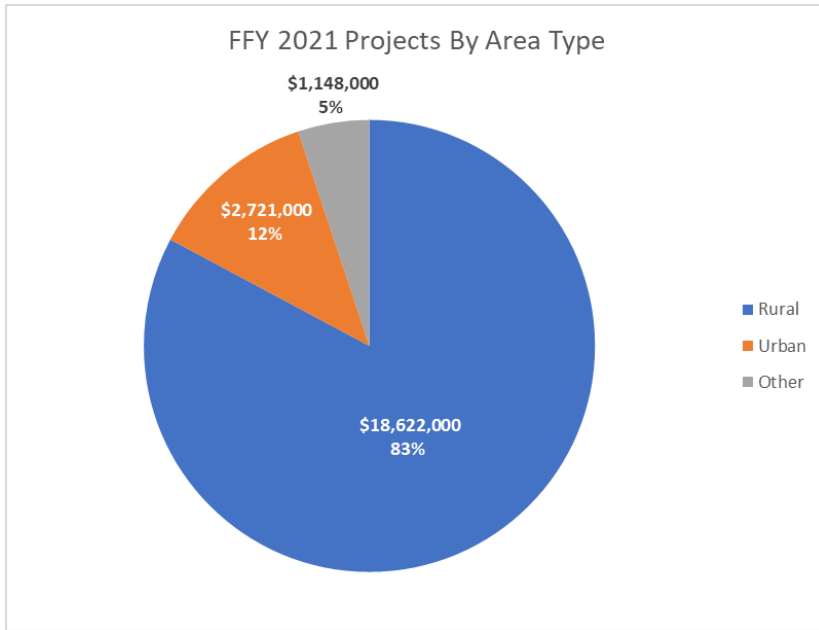
In the following graphs, the one-year project list has been divided into the same analysis categories used in Section 1 for crash analysis and in Section 2 for HSIP allocation goals. The projects should follow the distribution findings in Section 1 and 2.



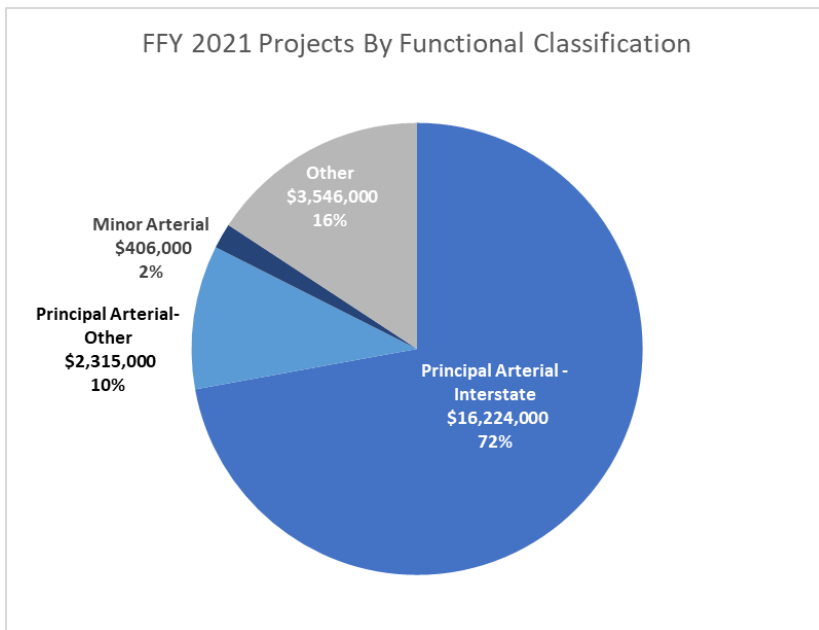
The projects in the one-year list are mostly designed to reduce roadway departure crashes. This distribution matches the crash data analysis which identified 59% of fatalities occurring because of roadway departure crashes.



The one-year project list breakdown by selection method shows a shift from primarily hot spot projects in recent years back to more systemic projects. Programming more systemic projects allows for distributed safety improvements on roadway with widely dispersed crashes over many miles.



The crash data analysis clearly identified most crashes occurring in rural areas. The one-year project list shows 82% of the HSIP funding going to projects that improve safety on rural roads.



Analyzing the one-year projects by functional classification shows a significant emphasis on interstate roadways due to the crash data analysis identifying rural roadway departures on the interstate as a priority category to implement safety countermeasures.



The below table shows Nebraska’s FFY 2021 HSIP funding by program. Since NDOT only uses one, open, competitive program, all HSIP funds for FFY 2021 are shown in the one program category.

#### Project Summary Table

Program, Strategy, Or Activity	Number of Projects	Funding
HSIP Program	19	\$22,491,000

## Section 5: Summary Of Actions

Actions are needed to reduce Nebraska fatalities, Nebraska’s fatality rate, and the number of non-motorized fatalities and serious injuries in Nebraska. Based on the review of the crash data and historical HSIP obligations, NDOT has identified actions to take in the next year, next 5 years, and further into the future to improve Nebraska’s safety performance measures.

In the first year, Nebraska’s Interagency Safety Working Committee will review the SHSP for any mid-cycle adjustments based on the information provided in this HSIP Implementation Plan.

Adjustments might include adding non-motorized users as a critical emphasis area in the SHSP. Nebraska is not experiencing an increase in non-motorized fatalities and serious injuries. However, NDOT needs to be proactive in programming non-motorized safety improvement projects to maintain the current downward trend. Nebraska’s Strategic Safety Improvement Projects (SSIP) team will discuss developing a program with dedicated funding for Safe Transportation for Every Pedestrian (STEP) safety improvements to support reducing non-motorized crashes.

The in-depth review of crash data for the HSIP Implementation Plan reinvigorated the need for improved safety analysis methods identified in the SHSP. The SSIP will review developing or acquiring Empirical Bayes safety analysis software with safety performance functions to allow NDOT to analyze crash data using Highway Safety Manual methodology.

FHWA has provided technical assistance to support developing a pilot county rural local road safety plan. NDOT plans to use this pilot plan as a template for consultants to develop rural local road safety plans for each county in Nebraska. The development of these plans will occur over six to seven years. These plans will lead to projects that will improve safety on rural local roads, which was identified as the roadway category with the highest fatality rate.

Not all identified actions can be accomplished in the first year. The HSIP Implementation Plan identifies a five-year project planning horizon. Some project implementations or system changes will need to occur within that five-year window of action.

NDOT’s hot spot screening process only includes state owned roads. Local-owned roads are not being analyzed routinely in a data driven manner. NDOT needs to add local-owned roads to the hot spot screening process and

all systemic analysis processes. All public roads need to be reviewed in NDOT's safety analysis process. The group within NDOT that maintains crash data and conducts safety analysis is called the Highway Safety Section. This historical focus primarily on highway safety will need to pivot toward analyzing safety on all public roads if Nebraska's goal of zero fatalities will ever be achieved.

The HSIP Implementation Plan has identified installing cable median barrier along rural portions of the interstate and freeways as a strategy to reduce rural roadway departure fatalities. The cost per mile and length of need forces this strategy into a multi-year phased effort. The segments with the highest benefit-cost will be prioritized for the next five-years with a review and prioritization for the long-term planning horizon.

NDOT does not have a formal application process or form for applying for HSIP funds. NDOT plans to review the HSIP application process of other states and create an application with funding rounds and deadlines. An HSIP funding page will be created on the NDOT website to post the application, describe the application process, and provide tools for safety analysis and application submittal.

Nebraska's Strategic Highway Safety Program will be updated for 2022-2026. This will be the first opportunity for NDOT to develop the SHSP by integrating strategies identified in the HSIP Implementation Plan.

Local road safety plans for a portion of Nebraska counties will be developed each year until all counties have a local road safety plan. This planning work should be completed near the end of the five-year planning period. Projects identified in the first few rounds of plan development will be programmed into the five-year planning period.

NDOT's experience of under-obligating annual HSIP funds requires a shift in strategy to start over-programming HSIP projects. This change will create backup projects that will be ready when higher prioritized HSIP projects can't be delivered. This will allow 100% obligation of HSIP funds each year and expedite installation of safety improvements.

And of course, annual updates of HSIP Implementation Plan will be completed based on lessons learned, successes, and newly identified opportunities over the five-year period. These updates will include review of new data being collected in the new NDOT crash database after it is operational in 2021.

Beyond the next five-year period, the SHSP becomes the primary guidance for HSIP decision-making. The upcoming development of an SHSP update allows for the assessment of longer-term strategies extending past the five-year planning window. A few high-level ideas for the long term are:

- Identify ways to deliver projects in a more consistent manner to reduce the need to over-program projects to fully obligate HSIP funds each year.
- Identify new sources for safety funding outside of HSIP or identify ways to leverage HSIP funds to accomplish more safety improvements.
- Identifying partnerships for sharing crash data with other safety focused agencies and integrating non-crash data into safety analysis.
- Review NDOT's minimum design standards for integration of safety improvement countermeasures as a minimum standard on more roadway categories.

This HSIP Implementation Plan includes a review of crash data and historical HISP obligations. These previous decisions and observations illustrated the most effective safety countermeasure options for improving Nebraska's performance measures. Based on available HSIP funding, allocation goals were developed, which led to prioritizing and programming safety countermeasure projects. Because not all identified safety improvements could be completed in the one-year project list, the short-term and long-term actions were described for implementation.

Appendix A

One-Year Project List

FFY	Project Name	Project Number	Improvement Type	HSIP Cost	Program	SHSP Critical Emphasis Area	Area Type	Functional Classification	Roadway Ownership
2021	Statewide Lighting	HSIP-STWD(142)	Systemic	\$ 423,000	HSIP Program	Intersections	Rural	Multiple/Varies	State Highway Agency
2021	Peace Officer Crash Reporting System	HSIP-STWD(181)	Systemic	\$ 310,000	HSIP Program	Data	N/A	N/A	Not Applicable
2021	NTIP System, Phase4	HSIP-STWD(183)	Systemic	\$ 48,000	HSIP Program	Planning	N/A	N/A	Not Applicable
2021	Safety Analysis Software	Not Programmed	Systemic	\$ 630,000	HSIP Program	Planning	N/A	N/A	Not Applicable
2021	Rural Local Road Safety Plans	Not Programmed	Systemic	\$ 475,000	HSIP Program	Planning	Rural	Multiple/Varies	County Highway Agency
2021	Railroad Crossing Inventory	Not Programmed	Systemic	\$ 160,000	HSIP Program	Intersections	Multiple/Varies	Multiple/Varies	Multiple/Varies
2021	County Road Closure Kits	Not Programmed	Systemic	\$ 1,500,000	HSIP Program	Roadway Departure	Rural	Multiple/Varies	County Highway Agency
2021	N 27th St. Adaptive Signal	HSIP-5231(14)	Spot	\$ 1,520,000	HSIP Program	Intersections	Urban	Principal Arterial-Other	City or Municipal Highway Agency
2021	I-80 Lincoln to York Cable Median Barrier	Not Programmed	Systemic	\$ 9,725,000	HSIP Program	Roadway Departure	Rural	Principal Arterial - Interstate	State Highway Agency
2021	District 1 I-80 Tree Removal	Not Programmed	Systemic	\$ 546,000	HSIP Program	Roadway Departure	Rural	Principal Arterial - Interstate	State Highway Agency
2021	US-275, 25th St - 23rd St	HSIP-NH-275-7(198)	Spot	\$ 795,000	HSIP Program	Intersections	Urban	Principal Arterial-Other	State Highway Agency
2021	District 2 I-80 Tree Removal	Not Programmed	Systemic	\$ 247,000	HSIP Program	Roadway Departure	Rural	Principal Arterial - Interstate	State Highway Agency
2021	5-Points Intersection	HSIP-5409(3)	Spot	\$ 406,000	HSIP Program	Intersections	Urban	Minor Arterial	City or Municipal Highway Agency
2021	Grand Island Area Bridges	HSIP-80-7(170)	Spot	\$ 1,594,000	HSIP Program	Roadway Departure	Rural	Principal Arterial - Interstate	State Highway Agency
2021	District 4 I-80 Tree Removal	Not Programmed	Systemic	\$ 968,000	HSIP Program	Roadway Departure	Rural	Principal Arterial - Interstate	State Highway Agency
2021	District 5 I-80 Tree Removal	Not Programmed	Systemic	\$ 952,000	HSIP Program	Roadway Departure	Rural	Principal Arterial - Interstate	State Highway Agency
2021	Paxton East	HSIP-80-3(166)	Systemic	\$ 250,000	HSIP Program	Roadway Departure	Rural	Principal Arterial - Interstate	State Highway Agency
2021	Lexington East & West	HSIP-80-4(156)	Systemic	\$ 650,000	HSIP Program	Roadway Departure	Rural	Principal Arterial - Interstate	State Highway Agency
2021	District 6 I-80 Tree Removal	Not Programmed	Systemic	\$ 1,292,000	HSIP Program	Roadway Departure	Rural	Principal Arterial - Interstate	State Highway Agency