



VERMONT

# HIGHWAY SAFETY IMPROVEMENT PROGRAM 2018 ANNUAL REPORT



U.S. Department of Transportation  
Federal Highway Administration

Photo source: Federal Highway Administration

## Table of Contents

Table of Contents .....	2
Disclaimer .....	3
Executive Summary .....	4
Introduction.....	5
Program Structure .....	5
Program Administration.....	5
Program Methodology .....	9
Project Implementation.....	20
Funds Programmed .....	20
General Listing of Projects .....	22
Safety Performance .....	26
General Highway Safety Trends.....	26
Safety Performance Targets.....	40
Applicability of Special Rules .....	42
Evaluation .....	44
Program Effectiveness .....	44
Effectiveness of Groupings or Similar Types of Improvements .....	45
Year 2017.....	45
Project Effectiveness.....	49
Compliance Assessment .....	50

## Disclaimer

### **Protection of Data from Discovery Admission into Evidence**

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section [HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.”

23 U.S.C. 409 states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.”

## **Executive Summary**

During the state fiscal year (July 1, 2017 to June 30, 2018), VTrans conducted six road safety audits at hot spot locations in collaboration with law enforcement officers and other safety partners around the state. The Agency further continued to work with local municipalities and implemented a systemic safety program to address local road safety with emphasis on horizontal curves.

For the state fiscal year (July 1, 2017 to June 30, 2018), the total amount of funding that was obligated during the reporting period was \$18,216,154. Of these, \$15,421,932 was obligated from HSIP Section 148 and \$ 2,452,790 was obligated from Section 164.

Over the years, the HSIP and other related safety efforts have been efficient at reducing the number of major crashes (fatal + serious injury crashes). One of the principal measures of success that illustrates this is the reduction in the five-year average of major crashes which passed from 367 major crashes for the 2008-2012 period to 296 for the 2013-2017 period.

The five-year averages of the number of fatalities and serious injuries went down for the same periods as well. The five-year average of the number of fatalities went from 70 fatalities to 61 while the five-year average of the number of serious injuries went from 386 to 294 serious injuries.

## Introduction

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, States are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP Reporting Guidance dated December 29, 2016 and consists of five sections: program structure, progress in implementing highway safety improvement projects, progress in achieving safety outcomes and performance targets, effectiveness of the improvements and compliance assessment.

## Program Structure

### *Program Administration*

**Describe the general structure of the HSIP in the State.**

The overall program structure is centralized.

HSIP staff review high crash locations on the federal aid network and identify potential projects. Solutions are proposed to mitigate crash patterns and crash types. Crash modification factors and benefits-to-costs ratios (B/C ratio) are used to determine the best solutions. A project must have a B/C ratio of greater than 1 to be further considered.

A group of senior management review the recommendations for further advancement of the projects to scoping or design.

Major HSIP projects are designed by consultants or Agency staff following the normal project development process.

Small projects such as signage, markings, beacons and brush cutting are implemented via work orders done by the Agency.

Statewide projects related to signs and markings are contracted out yearly.

The Agency incorporate the SafetyEdge and centerline rumble stripes on all paving projects according to Agency guidelines.

Projects are evaluated by the Office of Highway Safety using before and after crash data for a period of three-years before and three years after construction.

**Where is HSIP staff located within the State DOT?**

Engineering

**Enter additional comments here to clarify your response for this question or add supporting information.**

## 2018 Vermont Highway Safety Improvement Program

HSIP staff is located under the Highway Division within the Office of Highway Safety.

### **How are HSIP funds allocated in a State?**

SHSP Emphasis Area Data

Other-Central Office via High Crash Location Reviews

### **Enter additional comments here to clarify your response for this question or add supporting information.**

HSIP funds are used to construct statewide pavement markings and sign projects. They are also used to implement projects as a result of the review of High Crash Locations. In additions, they are used to implement engineering design projects that are related to SHSP specific critical emphasis areas.

### **Describe how local and tribal roads are addressed as part of HSIP.**

Local roads that are part of the Federal Aid System are addressed the same way as state maintained roads, using the approved HSIP ranking methodology for the identification of locations with potential safety problems. The local roads that rank within the subset of top locations are reviewed through an engineering study. Low cost remedial actions are implemented via a statewide project, while high cost solutions are implemented by VTrans through the regular design process.

VTrans operates a program called Systemic Local Roads Safety Program (SLRS). This program targets all urban and rural local roads with traffic volumes of less than 5000 vehicles per day. This program includes town-maintained roads that are not necessarily on the Federal-Aid Systems. For this SLRS program, locations are identified by the regional planning commissions using crash risk factors (such as presence of a horizontal curve), crash data, and anecdotal information. For these locations, safety corridor reviews are performed to identify signing and marking improvements. These low cost treatments are designed and implemented via a statewide project. The methodology used to select the SLRS projects was attached as an uploaded document under the Program Methodology Section.

Approximately \$800,000 of HSIP funds are used for the SLRS program.

Upon the request of a municipality, VTrans will perform a road safety audit of any local road to assist the municipality with local safety concerns. A multidisciplinary team is put together, a site visit is performed and a report outlying recommendations is provided to the municipality

### **Identify which internal partners (e.g., State departments of transportation (DOTs) Bureaus, Divisions) are involved with HSIP planning.**

Traffic Engineering/Safety

Design

Maintenance

Operations

Governors Highway Safety Office

Other-VTrans Office of Highway Safety

### **Enter additional comments here to clarify your response for this question or add supporting information.**

## 2018 Vermont Highway Safety Improvement Program

These groups are mostly involved during the conduct of road safety audits and road safety reviews.

The Office of Highway Safety is responsible for maintaining the crash data and generating high crash locations lists.

### **Describe coordination with internal partners.**

Depending on the characteristics of the site to be reviewed, Design, Operations and Maintenance staff as well as the Governor's Highway Safety Office Enforcement Liaison are asked to take part to the visit of the site and to formulate some recommendations. Key individuals are contacted several weeks in advance usually by email by the lead investigator. For each site, along with a request to attend an on-site meeting, the lead investigator also sends relevant background information such as crash information and a general description of the problem.

Pavement markings and sign projects are designed by VTrans Traffic Design Section or their consultants. The coordination of projects with other units happens during the review of the projects. Specifically, the TSMO group is heavily involved with these reviews.

### **Identify which external partners are involved with HSIP planning.**

Regional Planning Organizations (e.g. MPOs, RPOs, COGs)

Other-Municipalities

Other-Regional Planning Commissions

Other-Law Enforcement

### **Enter additional comments here to clarify your response for this question or add supporting information.**

### **Describe coordination with external partners.**

As with internal partners, external partners are involved during the conduct of road safety audits and safety reviews. They are asked to take part to the visit of the sites and to formulate some recommendations. Key individuals are contacted several weeks in advance usually by email by the lead investigator. For each site, along with a request to attend an on-site meeting, the lead investigator also sends relevant background information such as crash information and a general description of the problem.

### **Have any program administration practices used to implement the HSIP changed since the last reporting period?**

Yes

### **Describe HSIP program administration practices that have changed since the last reporting period.**

## 2018 Vermont Highway Safety Improvement Program

There has been a continued challenge in the deployment of HSIP countermeasure projects in that they follow the same design process as every other road and bridge projects at VTrans. The solution may be identified quickly, however there is no priority put on an HSIP projects compared to other projects and therefore, implementation can take several years as the safety project works through the same design process (PE, ROW and construction) as all VTrans projects.

There are other business units at VTrans other than the Office of Highway Safety that are using HSIP funds.

The Assets Management & Programming Bureau at VTrans is responsible for programming project and the Office of Highway Safety is not directly responsible for programming safety projects.

The delivery of low cost projects, such as the installation of signs or the upgrade of signal equipment on town highways has been an issue as well. While, since 2012, we have been developing and contracting regional projects to implement these low cost solutions on town and city owned roads (thus making sure that federal procurement procedures are followed), the time lag between the road reviews and the installation of the low cost improvements has been two to four years. In addition, preparing formal plans for contacting purposes has also been time consuming. VTrans is working on developing an alternative contracting process to accelerate the delivery of these low cost projects using an on-call contractor. It is anticipated that this process will be in place during construction season 2019.

### **Are there any other aspects of HSIP Administration on which the State would like to elaborate?**

Yes

### **Describe other aspects of HSIP Administration on which the State would like to elaborate.**

There has been a continued challenge in the deployment of HSIP countermeasure projects in that they follow the same design process as every other road and bridge projects at VTrans. The solution may be identified quickly, however there is no priority put on an HSIP projects compared to other projects and therefore, implementation can take several years as the safety project works through the same design process (PE, ROW and construction) as all VTrans projects.

HSIP funds are used to implement projects that come out directly from the HSIP planning process performed by the Office of Highway Safety. However, HSIP funds are also used by other business units at VTrans such as Traffic Design, Roadway Design and the Municipal Assistance Bureau, to design and construct other safety projects in accordance with strategies of the Strategic Highway Safety Plan.

The Assets Management & Programming Bureau at VTrans is responsible for programming project and the Office of Highway Safety is not directly responsible for programming safety projects.

The delivery of low cost projects, such as the installation of signs or the upgrade of signal equipment on town highways has been an issue as well. While, since 2012, we have been developing and contracting regional projects to implement these low cost solutions on town and city owned roads (thus making sure that federal procurement procedures are followed), the time lag between the road reviews and the installation of the low cost improvements has been two to four years. In addition, preparing formal plans for contacting purposes has also been time consuming. VTrans is working on developing an alternative contracting process to accelerate the delivery of these low cost projects using an on-call contractor. It is anticipated that this process will be in place during construction season 2019.

**Does the State have an HSIP manual or similar that clearly describes HSIP planning, implementation and evaluation processes?**

Yes

**To upload a copy of the State processes, attach files below.**

File Name:

[FFY18 Systemic Local Road Safety.pdf](#)

[Vermont HSIP Manual February 19 2016.pdf](#)

[Vermont HSIP Low Cost Program October 2016.pdf](#)

**Select the programs that are administered under the HSIP.**

Low-Cost Spot Improvements

Sign Replacement And Improvement

Local Safety

HRRR

Other-School Zone Safety

Other-Major Project Spot Improvements

**Enter additional comments here to clarify your response for this question or add supporting information.**

Local Safety refers to our Systemic Local Road Safety Program (this program is an extension of our former HRRR program. SLRS addresses all local town owned roads. There are still projects that are being developed or about to be constructed from locations that were reviewed under the former HRRR program).

HRRR refers to the HRRR Special Rules under FAST Act that requires a State to obligate a certain amount of funds on HRRRs if the fatality rate on its rural roads increases. This program is not active at this time in Vermont as Vermont has not been penalized.

Low-Cost Safety Improvements refer to the implementation of the low-cost, short-term countermeasures identified during the road safety audits done at hot spot locations. Major Project Spot Improvements refer to the design of the higher cost projects that were identified during the road safety audits.

School Zone Safety is the review of school zones for uniform signage and markings.

**Program:** HRRR

**Date of Program Methodology:** 2/19/2016

**What is the justification for this program? [Check all that apply]**

Other-FAST Act Special Rules

**What is the funding approach for this program? [Check one]**

Other-Funding set-aside only if special rules apply

**What data types were used in the program methodology? [Check all that apply]**

**Crashes**

**Exposure**

**Roadway**

Other-Fatal and all injury crashes

Functional classification

**What project identification methodology was used for this program? [Check all that apply]**

Crash frequency

**Are local roads (non-state owned and operated) included or addressed in this program?**

Yes

**Are local road projects identified using the same methodology as state roads?**

Yes

**Describe the methodology used to identify local road projects as part of this program.**

**How are projects under this program advanced for implementation?**

Other-statewide project for low cost improvements

**Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).**

**Relative Weight in Scoring**

Available funding : 100

Total Relative Weight : 100

**Enter additional comments here to clarify your response for this question or add supporting information.**

As per the HSIP Manual, if VTrans is penalized by the Special Rule for HRRR safety, then the HRRR Program becomes effective for the required period of time. Under the HRRR Program, VTrans may utilize a combination of site-specific, systemic, and corridor projects to address the identified issues as appropriate. VTrans defines "significant safety risks" as those rural major and minor collectors and rural local roads with three or more fatal and injury crashes per mile over a five-year period.

2018 Vermont Highway Safety Improvement Program  
What VTrans used to call HRRR in the past, is now done under the expended Systemic Local Road Safety Program as was explained in the clarification to question 14.

**Program:** Local Safety

**Date of Program Methodology:** 2/19/2016

**What is the justification for this program? [Check all that apply]**

Addresses SHSP priority or emphasis area

**What is the funding approach for this program? [Check one]**

Funding set-aside

**What data types were used in the program methodology? [Check all that apply]**

<b>Crashes</b>	<b>Exposure</b>	<b>Roadway</b>
All crashes	Volume	Horizontal curvature Functional classification

**What project identification methodology was used for this program? [Check all that apply]**

Crash frequency

**Are local roads (non-state owned and operated) included or addressed in this program?**

Yes

**Are local road projects identified using the same methodology as state roads?**

Yes

**Describe the methodology used to identify local road projects as part of this program.**

**How are projects under this program advanced for implementation?**

Competitive application process

**Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).**

**Relative Weight in Scoring**

2018 Vermont Highway Safety Improvement Program

Available funding : 100

Total Relative Weight : 100

**Enter additional comments here to clarify your response for this question or add supporting information.**

The SLRS program addresses rural and urban roads that are locally maintained by a municipality and have less than 5,000 vehicles per day, and focuses on risk factors rather than primarily crash history to identify sites for improvements. Our current focus risk factor is horizontal curves meeting certain criteria.

**Program:** Low-Cost Spot Improvements

**Date of Program Methodology:** 10/3/2016

**What is the justification for this program? [Check all that apply]**

Addresses SHSP priority or emphasis area

**What is the funding approach for this program? [Check one]**

Funding set-aside

**What data types were used in the program methodology? [Check all that apply]**

<b>Crashes</b>	<b>Exposure</b>	<b>Roadway</b>
All crashes	Traffic Lane miles	Functional classification

**What project identification methodology was used for this program? [Check all that apply]**

Equivalent property damage only (EPDO Crash frequency)  
Relative severity index  
Crash rate

**Are local roads (non-state owned and operated) included or addressed in this program?**

Yes

**Are local road projects identified using the same methodology as state roads?**

Yes

**Describe the methodology used to identify local road projects as part of this program.**

**How are projects under this program advanced for implementation?**

Other-Office of Highway Safety Staff based on recommendations from Road Safety Audit Team

**Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).**

**Relative Weight in Scoring**

Available funding : 100

Total Relative Weight : 100

**Enter additional comments here to clarify your response for this question or add supporting information.**

This program implements the low cost countermeasures identified during the review of high crash locations. Part of the execution of the HSIP includes prioritizing mitigation measures based on cost. The low cost solutions typically center around minimally invasive changes. This low cost program seeks to facilitate VTrans' ability to implement these changes expeditiously.

**Program:** Sign Replacement And Improvement

**Date of Program Methodology:** 2/9/2015

**What is the justification for this program? [Check all that apply]**

Addresses SHSP priority or emphasis area

**What is the funding approach for this program? [Check one]**

Competes with all projects

**What data types were used in the program methodology? [Check all that apply]**

Crashes

Exposure

Roadway

Other-Sign replacement needs

**What project identification methodology was used for this program? [Check all that apply]**

Other-Average Sign Age

2018 Vermont Highway Safety Improvement Program

**Are local roads (non-state owned and operated) included or addressed in this program?**

No

**Are local road projects identified using the same methodology as state roads?**

Yes

**Describe the methodology used to identify local road projects as part of this program.**

**How are projects under this program advanced for implementation?**

Other-Programed by Asset Management & Performance Bureau

**Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).**

**Relative Weight in Scoring**

Available funding : 100

Total Relative Weight : 100

**Enter additional comments here to clarify your response for this question or add supporting information.**

The goal is to construct 100 road miles per year via sign replacement projects.

**Program:** Other-School Zone Safety

**Date of Program Methodology:** 1/1/2014

**What is the justification for this program? [Check all that apply]**

Other-Addresses pedestrian safety in school zones

**What is the funding approach for this program? [Check one]**

Funding set-aside

**What data types were used in the program methodology? [Check all that apply]**

**What project identification methodology was used for this program? [Check all that apply]**

Other-Participation in the safe route to school program

**Are local roads (non-state owned and operated) included or addressed in this program?**

Yes

**Are local road projects identified using the same methodology as state roads?**

Yes

**Describe the methodology used to identify local road projects as part of this program.**

**How are projects under this program advanced for implementation?**

Other-All sites are advanced for signs and markings

**Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).**

**Rank of Priority Consideration**

Other-All sites are advanced : 1

**Enter additional comments here to clarify your response for this question or add supporting information.**

The Vermont Agency of Transportation (VTrans) has developed a School Zone Safety Initiative to help achieve uniform applications of traffic control devices within Vermont's local school zones for the purpose of enhancing the safety of road users through these school zones. This program was initiated in 2014. However due to lack of personal, VTrans has not done new reviews in the last two years. The program is still active as there are sign projects related to this program that are still being developed and that will be constructed in the future.

**Program:** Other-Major Project Spot Improvements

**Date of Program Methodology:** 2/19/2016

**What is the justification for this program? [Check all that apply]**

2018 Vermont Highway Safety Improvement Program

Addresses SHSP priority or emphasis area

**What is the funding approach for this program? [Check one]**

Competes with all projects

**What data types were used in the program methodology? [Check all that apply]**

**Crashes**

**Exposure**

**Roadway**

All crashes

Traffic  
Lane miles

Functional classification

**What project identification methodology was used for this program? [Check all that apply]**

Equivalent property damage only (EPDO Crash frequency)

Relative severity index

Crash rate

**Are local roads (non-state owned and operated) included or addressed in this program?**

Yes

**Are local road projects identified using the same methodology as state roads?**

Yes

**Describe the methodology used to identify local road projects as part of this program.**

**How are projects under this program advanced for implementation?**

selection committee

**Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).**

**Rank of Priority Consideration**

Available funding : 1

Incremental B/C : 2

**Enter additional comments here to clarify your response for this question or add supporting information.**

2018 Vermont Highway Safety Improvement Program

Potential major projects that have been identified during the road safety audits of high crash locations are reviewed by a selection committee. The selected projects are programmed based on funding availability.

**What percentage of HSIP funds address systemic improvements?**

77

**HSIP funds are used to address which of the following systemic improvements? Please check all that apply.**

- Install/Improve Signing
- Install/Improve Pavement Marking and/or Delineation
- Upgrade Guard Rails
- Add/Upgrade/Modify/Remove Traffic Signal

**Enter additional comments here to clarify your response for this question or add supporting information.**

VTrans has developed and implemented policies for centerline rumble strips and the SafetyEdge on all paving projects.

**What process is used to identify potential countermeasures? [Check all that apply]**

- Engineering Study
- Road Safety Assessment
- Crash data analysis
- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)

**Enter additional comments here to clarify your response for this question or add supporting information.**

Countermeasures are identified based on a review of the crash history (e.g., crash summary tables and collision diagram), existing conditions (e.g., traffic operations, roadway design, and adjacent land use), past studies, planned future developments and designs, and a field study to observe road user behaviors.

Crash modification factors are used to estimate the potential crash reduction that could be achieved by each countermeasures.

**Does the State HSIP consider connected vehicles and ITS technologies?**

No

**Enter additional comments here to clarify your response for this question or add supporting information.**

## 2018 Vermont Highway Safety Improvement Program

The HSIP does not address ITS or automated vehicles directly. However, HSIP funds are being used on traffic signal projects that consider autonomous vehicles and ITS technologies.

### **Does the State use the Highway Safety Manual to support HSIP efforts?**

Yes

### **Please describe how the State uses the HSM to support HSIP efforts.**

Vermont has been using the overall safety management process discussed in Part B of the HSM to conduct the HSIP.

Vermont has been using the critical rate method to screen the roadway network when identifying high crash locations.

Vermont has been using the methodology shown in Appendix 4a to update its crash cost estimates.

Vermont has been using crash modification factors for estimating the crash reduction benefits when calculating benefits/costs ratios (B/C ratio) for evaluating alternatives.

Vermont is in the process of preparing an implementation plan for incorporating AASHTOWARE SafetyAnalyst into the safety management process.

Vermont has used at some occasions the predictive equations presented in Part C of the HSM when conducting some site impacts analysis. However, the fact the equations are not calibrated to Vermont conditions has limited the use of these tools.

In FFY2019, Vermont will work with the UVM Transportation to calibrate the HSM equations for two-lane rural roads found in Chapter 10 of the HSM.

### **Have any program methodology practices used to implement the HSIP changed since the last reporting period?**

No

### **Are there any other aspects of the HSIP methodology on which the State would like to elaborate?**

Yes

### **Describe other aspects of the HSIP methodology on which the State would like to elaborate.**

The main challenge concerning our HSIP ranking methodology for spot improvements continues to be that it does not address roads that are off the Federal Aid System. The current HSIP ranking methodology generates

## 2018 Vermont Highway Safety Improvement Program

locations based on the high crash locations that are generated by VTrans' Highway Safety Data Section. The data that the Highway Safety Data Section uses as input are only for the roads that fall under the Federal Aid highway system. Consequently, only locally maintained roads that are on the Federal Aid systems are considered as part of the ranking methodology of the HSIP.

Given that Vermont is a rural state with crashes that tend to be dispersed, another ongoing challenge with our current spot improvement methodology is that it tends to identify rural locations with very few crashes or urban locations with a large number of crashes at high traffic intersections.

VTrans is working towards the implementation AASHTOWare SafetyAnalyst within our HSIP process. In FF2017, a consultant was hired to review Vermont's existing data availability and quality, conduct a gap analysis between existing data sets and the Safety Analyst data requirements and prioritize the data collection and transformation needs for implementation. We are currently collecting an inventory of intersections. We are hoping to include all public roads while implementing the AASHTOWare SafetyAnalyst methodology. We are expecting that SafetyAnalyst will solve the issues mentioned previously.

## Project Implementation

### Funds Programmed

#### Reporting period for HSIP funding.

State Fiscal Year

Enter additional comments here to clarify your response for this question or add supporting information.

Enter the programmed and obligated funding for each applicable funding category.

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	\$15,421,933	\$15,421,933	100%
HRRR Special Rule (23 U.S.C. 148(g)(1))	\$0	\$0	0%
Penalty Funds (23 U.S.C. 154)	\$0	\$0	0%
Penalty Funds (23 U.S.C. 164)	\$2,452,791	\$2,452,791	100%
RHCP (for HSIP purposes) (23 U.S.C. 130(e)(2))	\$0	\$0	0%
Other Federal-aid Funds (i.e. STBG, NHPP)	\$341,431	\$341,431	100%
State and Local Funds	\$0	\$0	0%
<b>Totals</b>	<b>\$18,216,155</b>	<b>\$18,216,155</b>	<b>100%</b>

Enter additional comments here to clarify your response for this question or add supporting information.

The funds listed under Other Federal-aid Funds are funds that were programmed and obligated under HRRRP (SAFETEA-LU).

How much funding is programmed to local (non-state owned and operated) or tribal safety projects?

16%

How much funding is obligated to local or tribal safety projects?

16%

Enter additional comments here to clarify your response for this question or add supporting information.

How much funding is programmed to non-infrastructure safety projects?

\$10,000

**How much funding is obligated to non-infrastructure safety projects?**

\$10,000

**Enter additional comments here to clarify your response for this question or add supporting information.**

0.05 percent was programmed and obligated to non-infrastructure safety projects.

**How much funding was transferred in to the HSIP from other core program areas during the reporting period under 23 U.S.C. 126?**

0%

**How much funding was transferred out of the HSIP to other core program areas during the reporting period under 23 U.S.C. 126?**

0%

**Enter additional comments here to clarify your response for this question or add supporting information.**

**Discuss impediments to obligating HSIP funds and plans to overcome this challenge in the future.**

VTrans has several large HSIP funded projects that are currently in the development process. When all of these projects reach construction as anticipated, there will not be enough HSIP funds available to construct these projects. VTrans is working to develop a better system to track Section 164 and 148 funded projects through its Project Navigation System. VTrans will be working on developing a prioritized list of projects for construction.

**Does the State want to elaborate on any other aspects of it's progress in implementing HSIP projects?**

Yes

**Describe any other aspects of the State's progress in implementing HSIP projects on which the State would like to elaborate.**

The 2016 FHWA lead HSIP review recognized that HSIP funds were used by other VTrans business units (other than the Office of Highway Safety) to develop and implement safety projects. VTrans will be working in the future to develop a process to track all projects that uses HSIP funds during implementation and to gauge their effectiveness on reducing highway fatalities and serious injuries after completion.

2018 Vermont Highway Safety Improvement Program

**General Listing of Projects**

List the projects obligated using HSIP funds for the reporting period.

													RELATIONSHIP TO SHSP	
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	EMPHASIS AREA	STRATEGY
BARRE TOWN HES STPG 6100(6) - Development	Intersection traffic control	Systemic improvements - signal-controlled	1	Intersections	\$133791.62	\$133791.62	Penalty Funds (23 U.S.C. 164)	Urban Minor Arterial	11,900	35	State Highway Agency	Spot	Intersections	Improve Operations
BARRE TOWN STP HES 0169(8) - Development	Intersection geometry	Intersection geometrics - modify skew angle	1	Intersections	\$27000	\$27000	HSIP (23 U.S.C. 148)	Rural Major Collector	5,200	35	State Highway Agency	Spot	Intersections	Improve Geometry
BRATTLEBORO NH 2000(27) - Construction	Intersection traffic control	Pavement markings - refresh existing pavement markings	0.048	Miles	\$7000	\$7000	HSIP (23 U.S.C. 148)	Urban Principal Arterial (UPA) - Other	0		State Highway Agency	Spot	Intersections	Improve Signs and Markings
BRATTLEBORO NHG SIGN(53) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	0.242	Miles	\$15500	\$15500	HSIP (23 U.S.C. 148)	Urban Principal Arterial (UPA) - Other	15,400	35	Town or Township Highway Agency	Systemic	Older Drivers	Improve Signs and Markings
BURLINGTON HES 5000(18) - Development	Intersection traffic control	Modify control - two-way stop to roundabout	1	Intersections	\$50000	\$50000	HSIP (23 U.S.C. 148)	Urban Principal Arterial (UPA) - Other	6,300	25	City of Municipal Highway Agency	Spot	Intersections	Improve Operations
COLCHESTER HES NH 5600(14) - Development	Interchange design	Interchange design - other	1	Interchanges	\$400000	\$400000	HSIP (23 U.S.C. 148)	Urban Principal Arterial (UPA) - Other	22,800	35	State Highway Agency	Spot	Intersections	Improve Infrastructures for all Users
ESSEX STP 5400(10) - Development	Intersection traffic control	Systemic improvements - signal-controlled	1	Intersections	\$125000	\$125000	HSIP (23 U.S.C. 148)	Urban Principal Arterial (UPA) - Other	0	45	State Highway Agency	Spot	Intersections	Improve Operations
ESSEX STP 5400(7) - Construction	Intersection traffic control	Modify traffic signal - modernization/replacement	2	Intersections	\$1664265.18	\$1664265.18	HSIP (23 U.S.C. 148)	Urban Minor Arterial	0	35	State Highway Agency	Spot	Intersections	Improve Operations
LUDLOW HES SGNL(44) - Construction	Intersection traffic control	Intersection traffic control - other	1	Intersections	\$616931.97	\$616931.97	Penalty Funds (23 U.S.C. 164)	Rural Principal Arterial (RPA) - Other	0	50	State Highway Agency	Spot	Intersections	Improve Operations
MILTON HES 028-1(27) - Construction	Roadway signs and traffic control	Roadway signs and traffic control - other	1	Intersections	\$13465.64	\$13465.64	Penalty Funds (23 U.S.C. 164)	Urban Minor Arterial	0	50	State Highway Agency	Spot	Intersections	Improve Signs and Markings
MORRISTOWN STP HES 030-2(28) - Construction	Intersection geometry	Intersection geometrics - modify skew angle	1	Intersections	\$603301.26	\$603301.26	HSIP (23 U.S.C. 148)	Rural Minor Arterial	7,200	40	State Highway Agency	Spot	Intersections	Improve Geometry
MORRISTOWN STPG SGNL(47) - Closing	Intersection traffic control	Intersection traffic control - other	2	Intersections	\$142126	\$142126	HSIP (23 U.S.C. 148)		11,000		State Highway Agency	Spot	Intersections	Improve Geometry
ROCKINGHAM-HARTFORD IMG SIGN(54) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	34	Miles	\$1198417.47	\$1198417.47	HSIP (23 U.S.C. 148)	Rural Principal Arterial (RPA) - Interstate	19,200		State Highway Agency	Systemic	Older Drivers	Improve Signs and Markings

2018 Vermont Highway Safety Improvement Program

													RELATIONSHIP TO SHSP	
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	EMPHASIS AREA	STRATEGY
RUTLAND TOWN NHG 019-3(60) - Construction	Intersection traffic control	Modify traffic signal - modernization/replacement	1	Intersections	\$34832.1	\$34832.1	HSIP (23 U.S.C. 148)	Urban Principal Arterial (UPA) - Other	0		State Highway Agency	Spot	Intersections	Improve Operations
SOUTH HERO STP HES 028-1(22) - Development	Intersection geometry	Auxiliary lanes - add left-turn lane	1	Intersections	\$112500	\$112500	HSIP (23 U.S.C. 148)	Rural Minor Arterial	8,900	50	State Highway Agency	Spot	Intersections	Improve Geometry
STATEWIDE - NORTH REGION STP HRRR(22) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	50	Miles	\$170715.65	\$170715.65	Other Federal-aid Funds (i.e. STBG, NHPP)	Rural Local Road or Street	0	0	Town or Township Highway Agency	Systemic	Older Drivers	Improve Infrastructures for all Users
STATEWIDE - NORTH REGION STP HRRR(22) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	50	Miles	\$702884.32	\$702884.32	Penalty Funds (23 U.S.C. 164)	Rural Local Road or Street	0	0	Town or Township Highway Agency	Systemic	Older Drivers	Improve Infrastructures for all Users
STATEWIDE - NORTHEAST REGION STPG MARK(306) - Closing	Roadway delineation	Longitudinal pavement markings - remarking			\$567996.34	\$567996.34	HSIP (23 U.S.C. 148)		0			Systemic	Lane Departure	Improve Signs and Markings
STATEWIDE - NORTHEAST REGION STPG MARK(310) - Construction	Roadway delineation	Longitudinal pavement markings - remarking			\$990000	\$990000	HSIP (23 U.S.C. 148)		0			Systemic	Lane Departure	Improve Signs and Markings
STATEWIDE - NORTHEAST REGION STPG SIGN(66) - Development	Roadway signs and traffic control	Roadway signs (including post) - new or updated	43.435	Miles	\$97500	\$97500	HSIP (23 U.S.C. 148)	Rural Minor Arterial	0		State Highway Agency	Systemic	Older Drivers	Improve Signs and Markings
STATEWIDE - NORTHEAST STPG SIGN(56) - Closing	Roadway signs and traffic control	Roadway signs (including post) - new or updated	56.307	Miles	\$3374.59	\$3374.59	HSIP (23 U.S.C. 148)		0		State Highway Agency	Systemic	Older Drivers	Improve Infrastructures for all Users
STATEWIDE - NORTHEAST STPG SIGN(62) - Construction	Roadway signs and traffic control	Sign sheeting - upgrade or replacement	60.696	Miles	\$375763.13	\$375763.13	HSIP (23 U.S.C. 148)		1,000	50	State Highway Agency	Systemic	Older Drivers	Improve Signs and Markings
STATEWIDE - NORTHWEST REGION STPG MARK(307) - Construction	Roadway delineation	Longitudinal pavement markings - remarking			\$1444963.49	\$1444963.49	HSIP (23 U.S.C. 148)		0			Systemic	Lane Departure	Improve Signs and Markings
STATEWIDE - NORTHWEST REGION STPG SIGN(58) - Closing	Roadway signs and traffic control	Roadway signs (including post) - new or updated	41.066	Miles	\$243599.99	\$243599.99	HSIP (23 U.S.C. 148)		1,000	50	State Highway Agency	Systemic	Lane Departure	Improve Signs and Markings
STATEWIDE - NORTHWEST REGION STPG	Roadway signs and traffic control	Roadway signs (including post) - new or updated	46.304	Miles	\$105000	\$105000	HSIP (23 U.S.C. 148)	Rural Major Collector	0		State Highway Agency	Systemic	Lane Departure	Improve Signs and Markings

2018 Vermont Highway Safety Improvement Program

													RELATIONSHIP TO SHSP	
PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	EMPHASIS AREA	STRATEGY
SIGN(65) - Development														
STATEWIDE - SOUTH REGION STP HRRR(23) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	50	Miles	\$801.72	\$801.72	HSIP (23 U.S.C. 148)	Rural Local Road or Street	0	0	Town or Township Highway Agency	Systemic	Older Drivers	Improve Infrastructures for all Users
STATEWIDE - SOUTH REGION STP HRRR(23) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	50	Miles	\$170715.66	\$170715.66	Other Federal-aid Funds (i.e. STBG, NHPP)	Rural Local Road or Street	0	0	Town or Township Highway Agency	Systemic	Older Drivers	Improve Infrastructures for all Users
STATEWIDE - SOUTH REGION STP HRRR(23) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	20	Miles	\$956774.33	\$956774.33	Penalty Funds (23 U.S.C. 164)	Rural Local Road or Street	0	0	Town or Township Highway Agency	Systemic	Older Drivers	Improve Infrastructures for all Users
STATEWIDE - SOUTHEAST REGION STPG MARK(308) - Closing	Roadway delineation	Longitudinal pavement markings - remarking			\$973351.49	\$973351.49	HSIP (23 U.S.C. 148)		0			Systemic	Lane Departure	Improve Signs and Markings
STATEWIDE - SOUTHEAST REGION STPG SIGN(67) - Development	Roadway signs and traffic control	Roadway signs (including post) - new or updated	40.155	Miles	\$90000	\$90000	HSIP (23 U.S.C. 148)	Rural Major Collector	0		State Highway Agency	Systemic	Lane Departure	Improve Signs and Markings
STATEWIDE - SOUTHWEST REGION STPG MARK(309) - Closing	Roadway delineation	Longitudinal pavement markings - remarking			\$510982.62	\$510982.62	HSIP (23 U.S.C. 148)		0		State Highway Agency	Systemic	Lane Departure	Improve Signs and Markings
STATEWIDE - SOUTHWEST REGION STPG MARK(313) - Construction	Roadway delineation	Longitudinal pavement markings - remarking			\$640000	\$640000	HSIP (23 U.S.C. 148)		0			Systemic	Lane Departure	Improve Signs and Markings
STATEWIDE - SOUTHWEST STPG SIGN(64) - Development	Roadway signs and traffic control	Roadway signs (including post) - new or updated	31.121	Miles	\$75000	\$75000	HSIP (23 U.S.C. 148)		0		State Highway Agency	Systemic	Older Drivers	Improve Infrastructures for all Users
STATEWIDE HES GARD(3) - Development	Roadway	Roadway - other	10	Locations	\$10000	\$10000	Penalty Funds (23 U.S.C. 164)		0		State Highway Agency	Systemic	Roadway Departure	Improve Infrastructures for all Users
STATEWIDE HES HSIP(7) - Development	Roadway signs and traffic control	Roadway signs and traffic control - other	42.023	Miles	\$8500	\$8500	Penalty Funds (23 U.S.C. 164)	Rural Principal Arterial (RPA) - Other	0		State Highway Agency	Spot	Intersections	Improve Signs and Markings
STATEWIDE HES HSIP(9) - Development	Roadway signs and traffic control	Roadway signs and traffic control - other	0.809	Miles	\$10000	\$10000	Penalty Funds (23 U.S.C. 164)		0		State Highway Agency	Spot	Roadway Departure	Improve Signs and Markings
STATEWIDE HES SHSP(8) - Planned	Non-infrastructure	Educational efforts	2	Locations	\$10000	\$10000	HSIP (23 U.S.C. 148)	Rural Minor Arterial	0	0	State Highway Agency	X regions per year	Education	Support municipalities in mitigating HCL

2018 Vermont Highway Safety Improvement Program

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	RELATIONSHIP TO SHSP	
													EMPHASIS AREA	STRATEGY
STATEWIDE IMG MARK(116) - Construction	Roadway delineation	Longitudinal pavement markings - remarking			\$690893.08	\$690893.08	HSIP (23 U.S.C. 148)		0		State Highway Agency	Systemic	Lane Departure	Improve Signs and Markings
STATEWIDE IMG MARK(117) - Development	Roadway delineation	Longitudinal pavement markings - remarking			\$25000	\$25000	HSIP (23 U.S.C. 148)		0		State Highway Agency	Systemic	Lane Departure	Improve Signs and Markings
STOWE STPG SGNL(52) - Development	Intersection geometry	Auxiliary lanes - add left-turn lane	1	Intersections	\$75000	\$75000	HSIP (23 U.S.C. 148)	Rural Minor Arterial	0	30	State Highway Agency	Spot	Intersections	Improve Geometry
WALLINGFORD-RUTLAND NHG SIGN(68) - Development	Roadway signs and traffic control	Roadway signs (including post) - new or updated	20.834	Miles	\$55000	\$55000	HSIP (23 U.S.C. 148)		0		State Highway Agency	Spot	Older Drivers	Improve Signs and Markings
WATERBURY STP SGNL(18) - Construction	Intersection traffic control	Modify control - modifications to roundabout	1	Intersections	\$4589	\$4589	HSIP (23 U.S.C. 148)	Rural Minor Arterial	6,650	25	Town or Township Highway Agency	Spot	Intersections	Improve Geometry
WILLISTON STP HES 5500(12) - Construction	Intersection traffic control	Modify traffic signal - miscellaneous/other/unspecified	1	Intersections	\$50000	\$50000	HSIP (23 U.S.C. 148)	Urban Minor Arterial	18,900	40	State Highway Agency	Spot	Intersections	Improve Operations
WILLISTON-ESSEX STPG SGNL(46) - Construction	Intersection traffic control	Modify traffic signal - modernization/replacement	18	Intersections	\$3939000.1	\$3939000.1	HSIP (23 U.S.C. 148)	Urban Principal Arterial (UPA) - Other	1,000	35	State Highway Agency	Systemic	Intersections	Improve Operations
WINOOSKI-CAMBRIDGE STPG SIGN(55) - Construction	Roadway signs and traffic control	Roadway signs (including post) - new or updated	23.94	Miles	\$74175	\$74175	HSIP (23 U.S.C. 148)		0		State Highway Agency	Systemic	Older Drivers	Improve Infrastructures for all Users

Enter additional comments here to clarify your response for this question or add supporting information.

This table was generated by our IT group. IT confirms that the table looks at obligations during the state fiscal year.

## Safety Performance

### *General Highway Safety Trends*

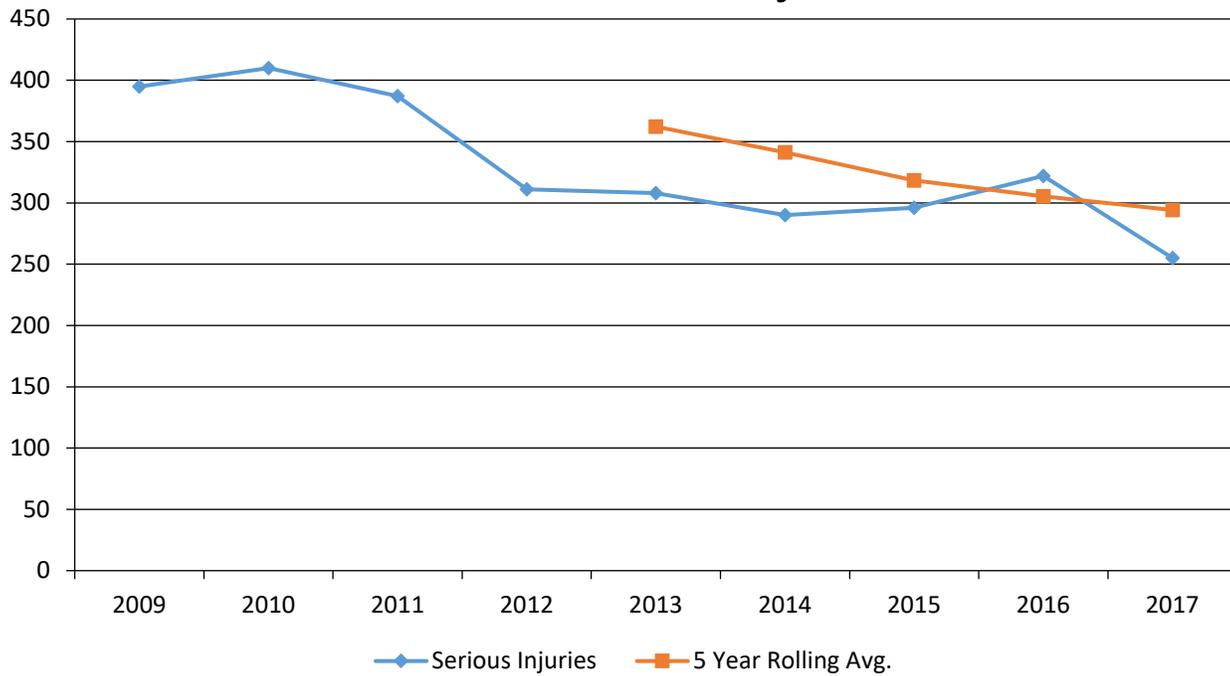
Present data showing the general highway safety trends in the State for the past five years.

PERFORMANCE MEASURES	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fatalities	74	71	55	77	70	44	57	62	70
Serious Injuries	395	410	387	311	308	290	296	322	255
Fatality rate (per HMVMT)	0.982	0.980	0.770	1.070	0.983	0.623	0.780	0.840	0.940
Serious injury rate (per HMVMT)	5.241	5.660	5.419	4.322	4.327	4.108	4.049	4.372	3.430
Number non-motorized fatalities	5	5	4	10	6	4	9	6	9
Number of non-motorized serious injuries	35	33	36	40	38	25	36	37	29

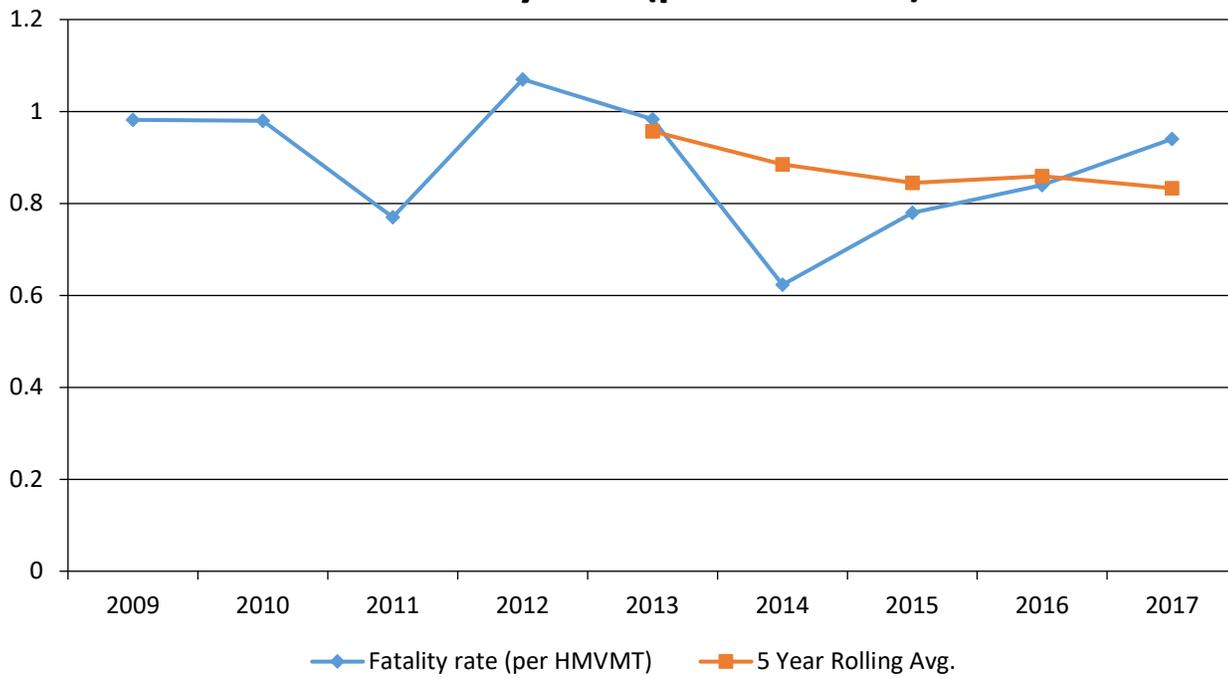
### Annual Fatalities



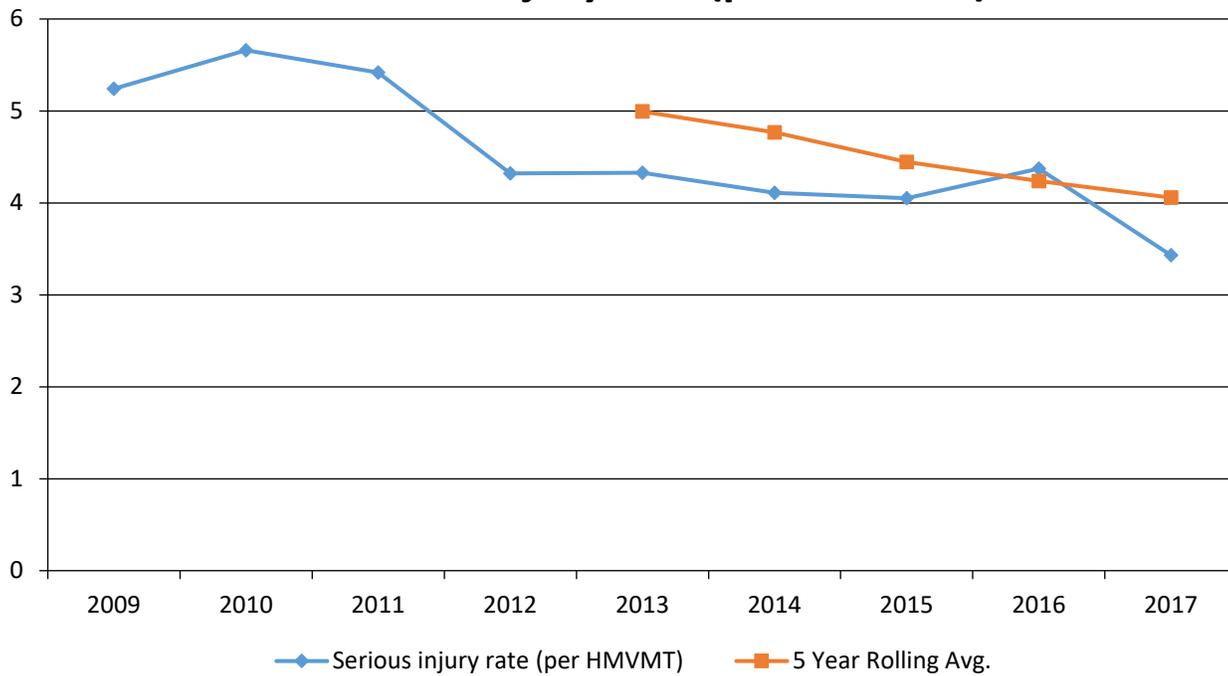
### Annual Serious Injuries



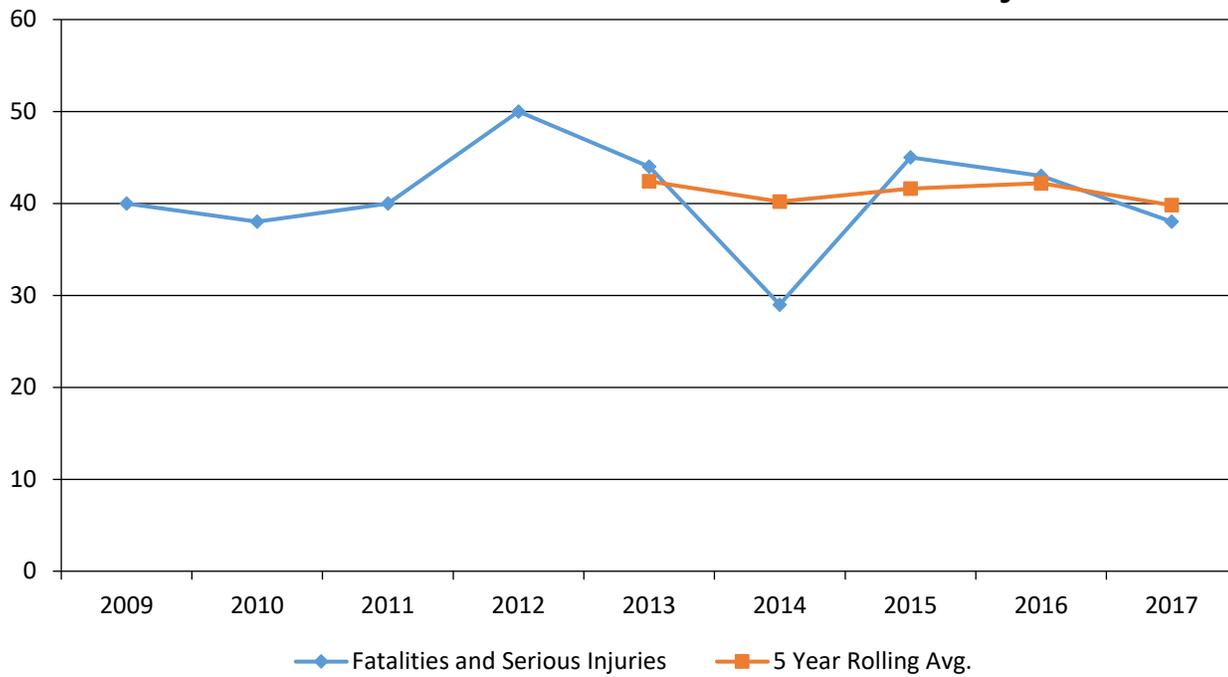
### Fatality rate (per HMVMT)



### Serious injury rate (per HMVMT)



### Non Motorized Fatalities and Serious Injuries



Enter additional comments here to clarify your response for this question or add supporting information.

Describe fatality data source.

FARS

Enter additional comments here to clarify your response for this question or add supporting information.

The number of fatalities is based on FARS.

To the maximum extent possible, present this data by functional classification and ownership.

#### Year 2017

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial (RPA) - Interstate	4.6	23.4	0.38	11.65
Rural Principal Arterial (RPA) - Other Freeways and Expressways	0	0	0	0
Rural Principal Arterial (RPA) - Other	9.2	29.2	1.29	6.45

## 2018 Vermont Highway Safety Improvement Program

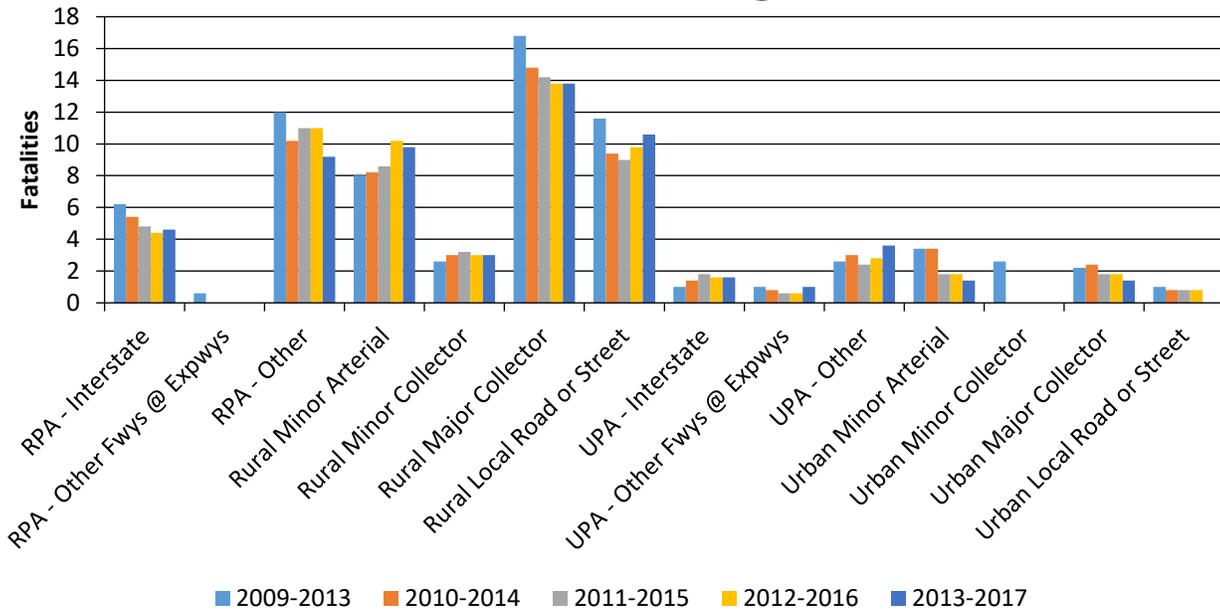
Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Minor Arterial	9.8	46.8	1.02	13.13
Rural Minor Collector	3	11	1.42	5.24
Rural Major Collector	13.8	56	1.21	10.36
Rural Local Road or Street	10.6	39	1.12	4.11
Urban Principal Arterial (UPA) - Interstate	1.6	4.8	0.3	0.93
Urban Principal Arterial (UPA) - Other Freeways and Expressways	1	1.4	1.72	2.38
Urban Principal Arterial (UPA) - Other	3.6	28.8	0.71	5.91
Urban Minor Arterial	1.4	18.6	0.39	5.21
Urban Minor Collector	0	0	0	0
Urban Major Collector	1.4	13.6	0.53	5.28
Urban Local Road or Street	0	8.8	0	2.51

2018 Vermont Highway Safety Improvement Program

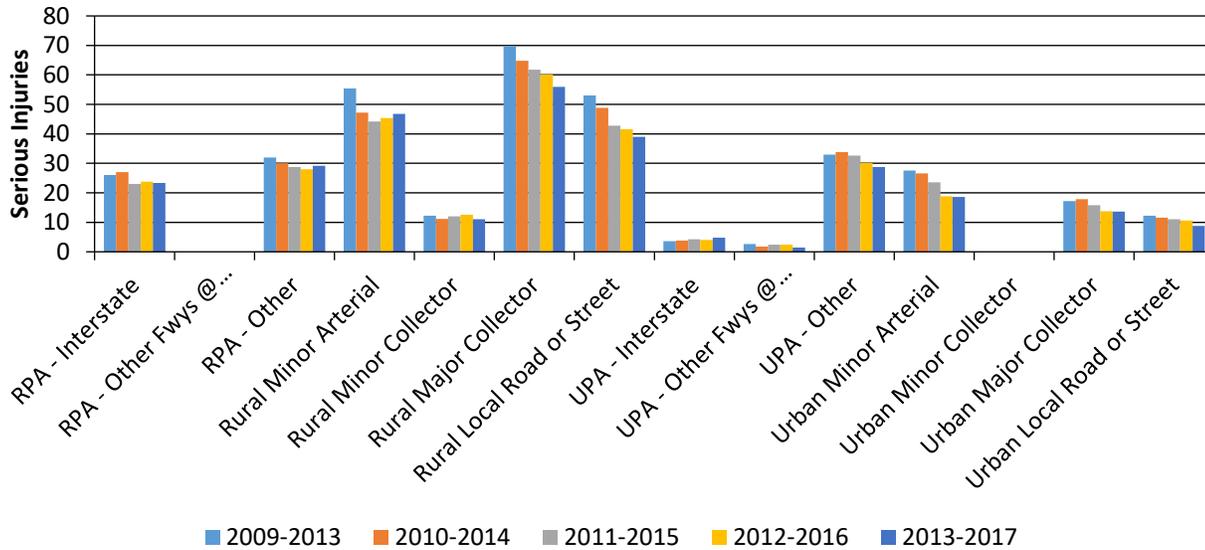
**Year 2017**

<b>Roadways</b>	<b>Number of Fatalities (5-yr avg)</b>	<b>Number of Serious Injuries (5-yr avg)</b>	<b>Fatality Rate (per HMVMT) (5-yr avg)</b>	<b>Serious Injury Rate (per HMVMT) (5-yr avg)</b>
State Highway Agency	39.8	184	0	0
County Highway Agency				
Town or Township Highway Agency	16.2	68.8	0	0
City of Municipal Highway Agency	4.4	35.6	0	0
State Park, Forest, or Reservation Agency				
Local Park, Forest or Reservation Agency				
Other State Agency				
Other Local Agency				
Private (Other than Railroad)	0.2	1.2	0	0
Railroad				
State Toll Authority				
Local Toll Authority				
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation				

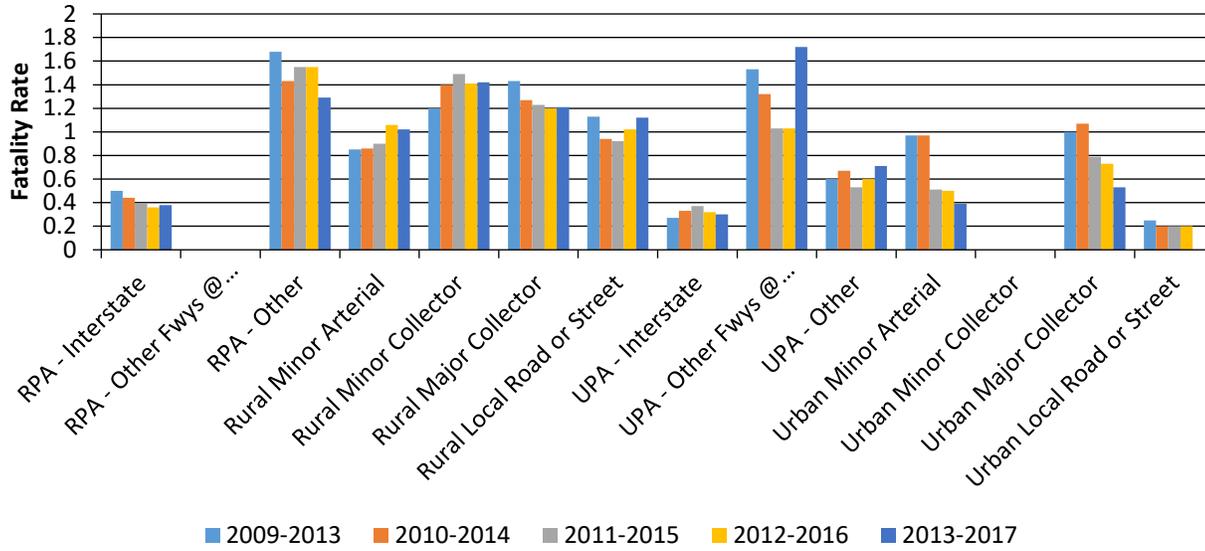
## Number of Fatalities by Functional Classification 5 Year Average



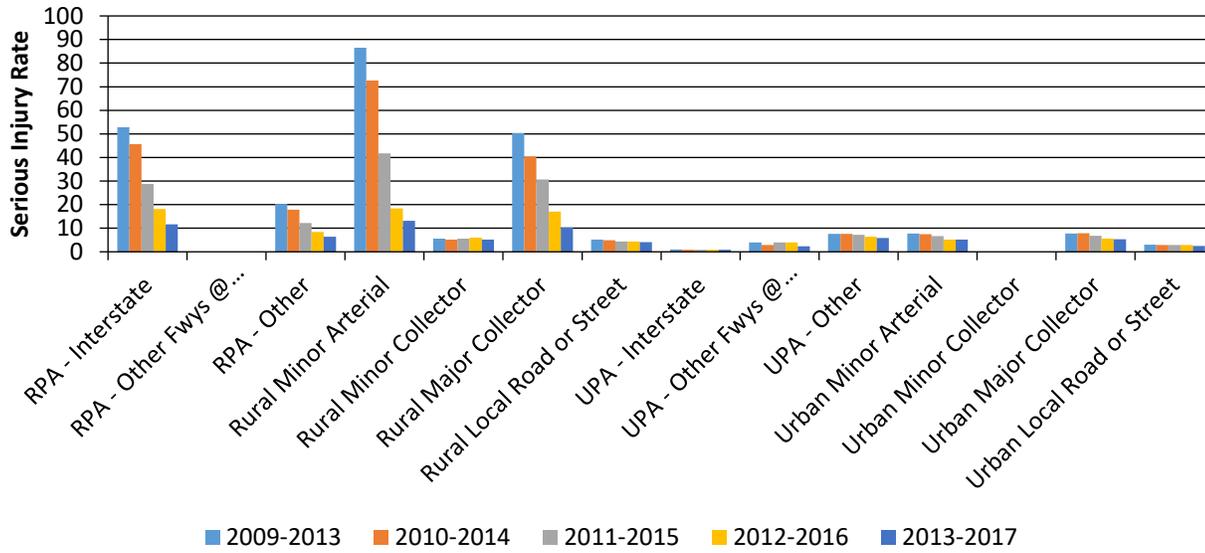
## Number of Serious Injuries by Functional Classification 5 Year Average



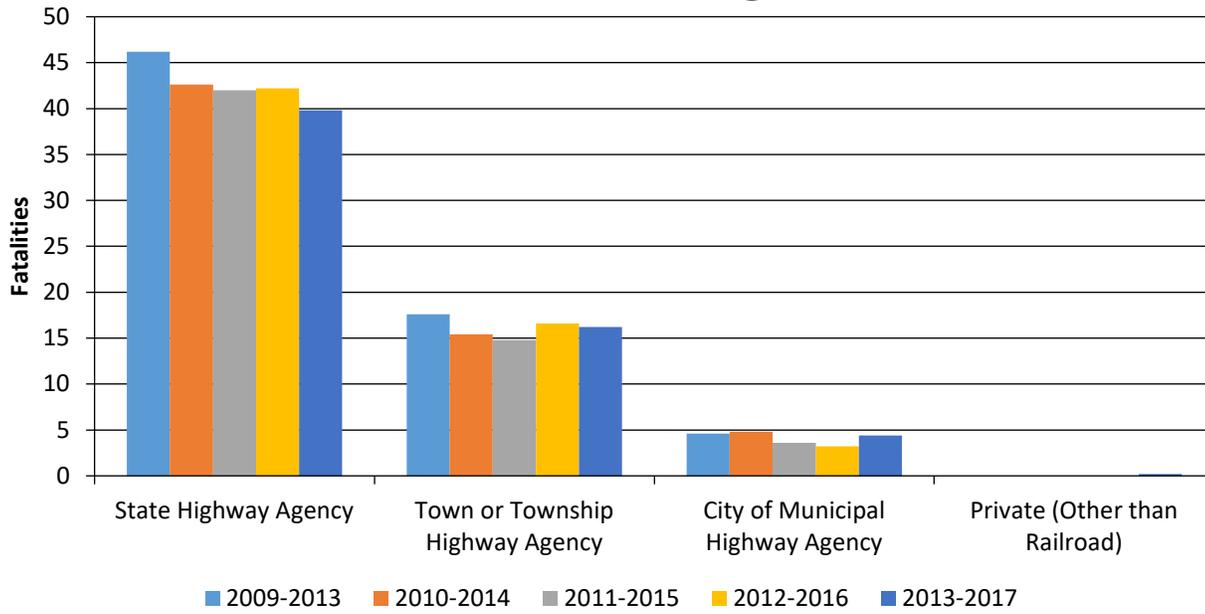
## Fatality Rate (per HMVMT) by Functional Classification 5 Year Average



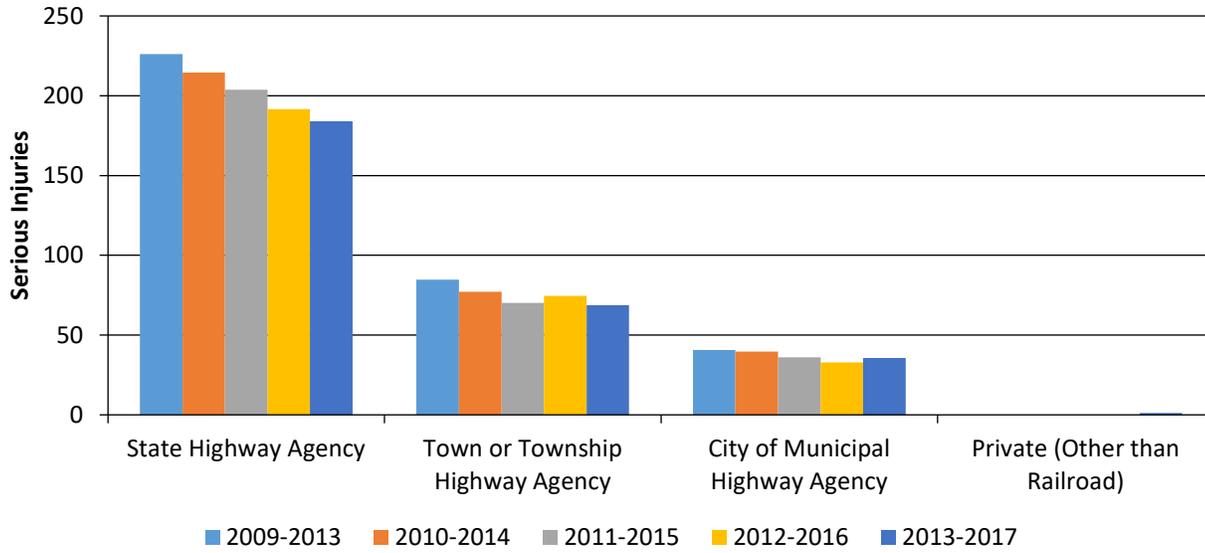
## Serious Injury Rate (per HMVMT) by Functional Classification 5 Year Average



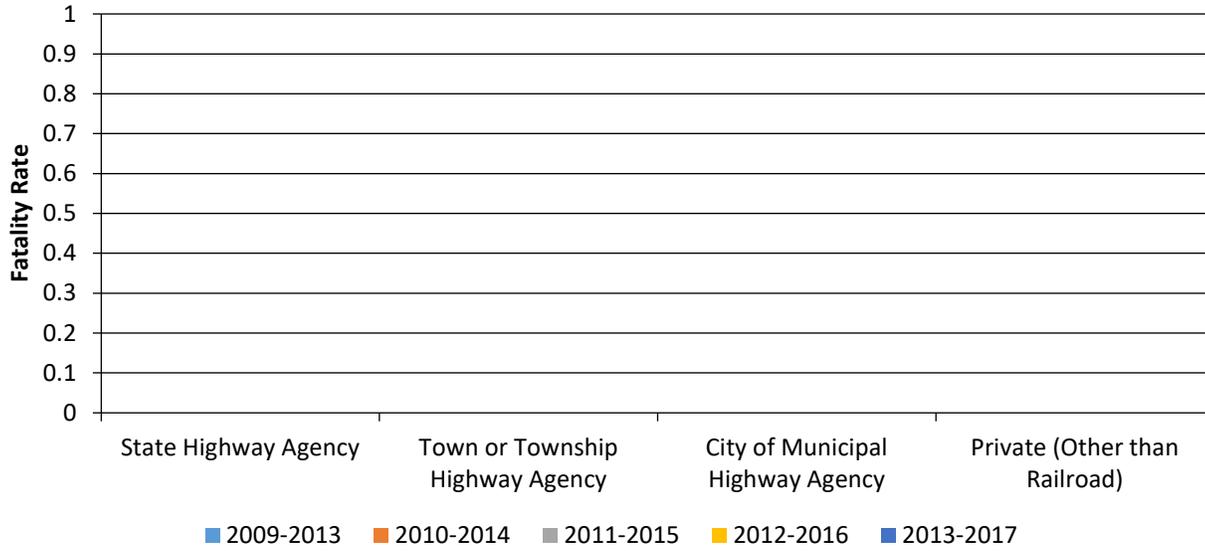
## Number of Fatalities by Roadway Ownership 5 Year Average



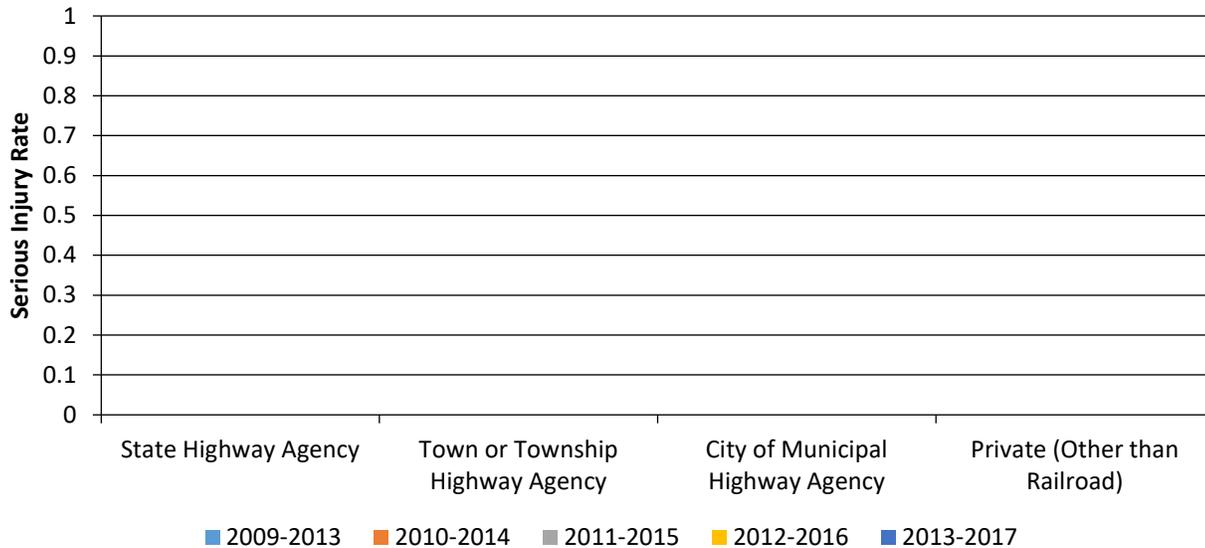
## Number of Serious Injuries by Roadway Ownership 5 Year Average



## Fatality Rate (per HMVMT) by Roadway Ownership 5 Year Average



## Serious Injury Rate (per HMVMT) by Roadway Ownership 5 Year Average



**Enter additional comments here to clarify your response for this question or add supporting information.**

Note that the data for State Highway Agency also include some crashes that took place on Vermont Class I Roads that would be owned by towns and cities.

Note also that HMVTMs by Roadway Ownership are not available.

In addition, urban boundaries were changed from 2013 to 2014 which could result in changes in mileage when compared to previous years.

**Are there any other aspects of the general highway safety trends on which the State would like to elaborate?**

Yes

**Provide additional discussion related to general highway safety trends.**

A unique element of safety implementation in Vermont is the collaborative effort of a group of public and private organizations under the Vermont Highway Safety Alliance (VHSA). The efforts of the VHSA are led by the Strategic Highway Safety Plan (SHSP).

Another uncommon aspect of safety implementation in Vermont is that VTTrans not only manages the Highway Safety Improvement Program but it also operates the Governor’s Highway Safety Program. This has facilitated

2018 Vermont Highway Safety Improvement Program

the coordination and implementation of behavioral countermeasures targeted at the Critical Emphasis Areas listed in the SHSP.

Over the years, leaving the road and crashes taking place at intersections have been the two crash types that have typically accounted for a large proportion of major crashes (fatal plus serious injury crashes) and those that are more readily addressed by the HSIP.

For several years, VTrans has been implementing statewide policies related to the inclusion of centerline rumble stripes and the SafetyEdge on all paving projects. The most recent Highway Safety Plan prepared by the Governor’s Highway Safety Program includes projects that are targeted at driver behaviors that lead to the occurrence of leaving the roadway including reducing impaired driving, reducing speeding and reducing distracted driving.

In spring 2018, VTrans continued its safety corridors effort and identified four new safety corridors (two along the interstate and two along two-lane rural roads) where high speeds are an issue. Education and enforcement effort will include message boards along with radar speed feedback signs and increased enforcement.

**Safety Performance Targets**

**Safety Performance Targets**

**Calendar Year 2019 Targets \***

**Number of Fatalities** 56.0

**Describe the basis for established target, including how it supports SHSP goals.**

The trend line used for this performance measure is based on over 10 years of data and utilizes a linear model to establish the 2019 target. The 2017-2021 Strategic Highway Safety Plan measures success in term of overall crash reduction in serious and fatal crashes with a goal of 10% reduction by 2021. The percentage reduction in fatalities expected by this target supports the goal of the SHSP by providing a 2.3% reduction over three years.

**Number of Serious Injuries** 265.0

**Describe the basis for established target, including how it supports SHSP goals.**

The trend line used for this performance measure is based on over 10 years of data and utilizes a linear model to establish the 2019 target. The 2017-2021 Strategic Highway Safety Plan measures success in term of overall crash reduction in serious and fatal crashes with a goal of 10% reduction by 2021. The proposed target reduces the number of serious injuries by 12% over three years.

**Fatality Rate** 0.800

**Describe the basis for established target, including how it supports SHSP goals.**

The trend line used for this performance measure is based on over 10 years of data and

## 2018 Vermont Highway Safety Improvement Program

utilizes a linear model to establish the 2019 target. Our proposed target is a reduction in the 5-year fatality rate, which support the overall reduction in fatal and serious crashes presented in the 2017-2021 Strategic Highway Safety Plan.

**Serious Injury Rate** 3.900

### **Describe the basis for established target, including how it supports SHSP goals.**

The trend line used for this performance measure is based on over 10 years of data and utilizes a linear model to establish the 2019 target. Our proposed target is a reduction in the 5-year serious injury rate, which support the overall reduction in fatal and serious crashes presented in the 2017-2021 Strategic Highway Safety Plan.

**Total Number of Non-Motorized Fatalities and Serious Injuries** 35.0

### **Describe the basis for established target, including how it supports SHSP goals.**

Different types of trend lines were explored to determine a reasonable trend. A 3rd degree polynomial trend line provided the best fit, which projected a slight decrease in 2019. The 2017-2021 Strategic Highway Safety Plan considers pedestrians and bicyclists as two separate emphasis areas with their own sets of strategies. The reduction goal for each of these two emphasis areas in the 2017-2021 Strategic Highway Safety Plan is a 10% reduction if fatal and serious injury crashes. Our proposed target is downward and contribute to the overall goal of the Strategic Highway Safety Plan.

### **Enter additional comments here to clarify your response for this question or add supporting information.**

### **Describe efforts to coordinate with other stakeholders (e.g. MPOs, SHSO) to establish safety performance targets.**

The Vermont Governor's Highway Safety Program is part of VTrans (Vermont Agency of Transportation). The Vermont Governor's Highway Safety Program operates under the Office of Highway Safety which also includes the unit that is responsible for the HSIP.

The three safety performance measures that are required for NHTSA's Highway Safety Plan (Number of fatalities, Fatality rate, Number of serious injuries) were developed collaboratively between the Governor's Highway Safety Program Chief and the Director of the Office of Highway Safety and the data analyst.

The other two measures (Serious injury rate and Pedestrian & Bicycle Fatalities and Serious Injuries) are needed for FHWA's Highway Safety Improvement Program. These two measures were determined among the HSIP staff, the data analyst and the Director of the Office of Highway Safety.

The target measures were sent to the Chittenden County MPO for their concurrence. The Chittenden County MPO has typically used the performance targets that have been developed by VTrans.

2018 Vermont Highway Safety Improvement Program  
**Does the State want to report additional optional targets?**

No

**Enter additional comments here to clarify your response for this question or add supporting information.**

Vermont does not wish to establish separate targets for the urbanized areas.

**Applicability of Special Rules**

**Does the HRRR special rule apply to the State for this reporting period?**

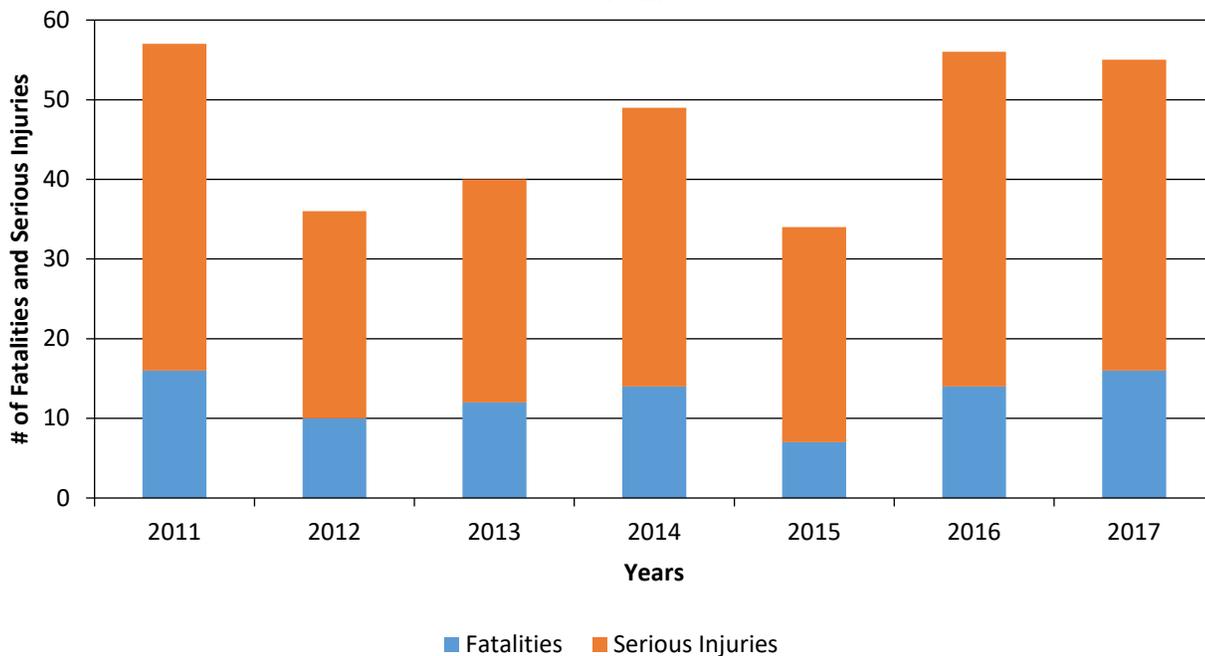
No

**Enter additional comments here to clarify your response for this question or add supporting information.**

**Provide the number of older driver and pedestrian fatalities and serious injuries 65 years of age and older for the past seven years.**

PERFORMANCE MEASURES	2011	2012	2013	2014	2015	2016	2017
Number of Older Driver and Pedestrian Fatalities	16	10	12	14	7	14	16
Number of Older Driver and Pedestrian Serious Injuries	41	26	28	35	27	42	39

**Number of Older Driver and Pedestrian Fatalities and Serious Injuries by Year.**



**Enter additional comments here to clarify your response for this question or add supporting information.**

## Evaluation

### *Program Effectiveness*

#### **How does the State measure effectiveness of the HSIP?**

Change in fatalities and serious injuries  
Other-Change in fatal and serious injury crashes

**Enter additional comments here to clarify your response for this question or add supporting information.**

#### **Based on the measures of effectiveness selected previously, describe the results of the State's program level evaluations.**

The overall effectiveness of the HSIP is measured by changes in the number of fatalities and serious injuries as well as by changes in the number of fatal and serious injury crashes (referred to as major crashes in the Strategic Highway Safety Plan).

The trend in the five-year average of the number of fatal crashes has been down from the 2009-2013 period to the 2013-2017 period passing from 63 fatal crashes to 56 fatal crashes.

Similarly, the five-year average of the number of serious injury crashes has also been going down passing from 295 serious injury crashes to 244.

The five-year averages of the number of fatalities and serious injuries went down for these same periods as well. The five-year average of the number of fatalities went from 69 fatalities to 61 while the five-year average of the number of serious injuries went from 362 to 294 serious injuries.

#### **What other indicators of success does the State use to demonstrate effectiveness and success of the Highway Safety Improvement Program?**

# RSAs completed  
Increased awareness of safety and data-driven process

**Enter additional comments here to clarify your response for this question or add supporting information.**

Six road safety audits were conducted in 2017 and three were conducted during the first half of 2018.

There has been an increase in the level of awareness of safety while developing other types of projects within VTrans. For example, the Pavement Management Unit has been requesting crash data and has been seeking input from the Office of Highway Safety when developing paving projects.

#### **Are there any significant programmatic changes that have occurred since the last reporting period?**

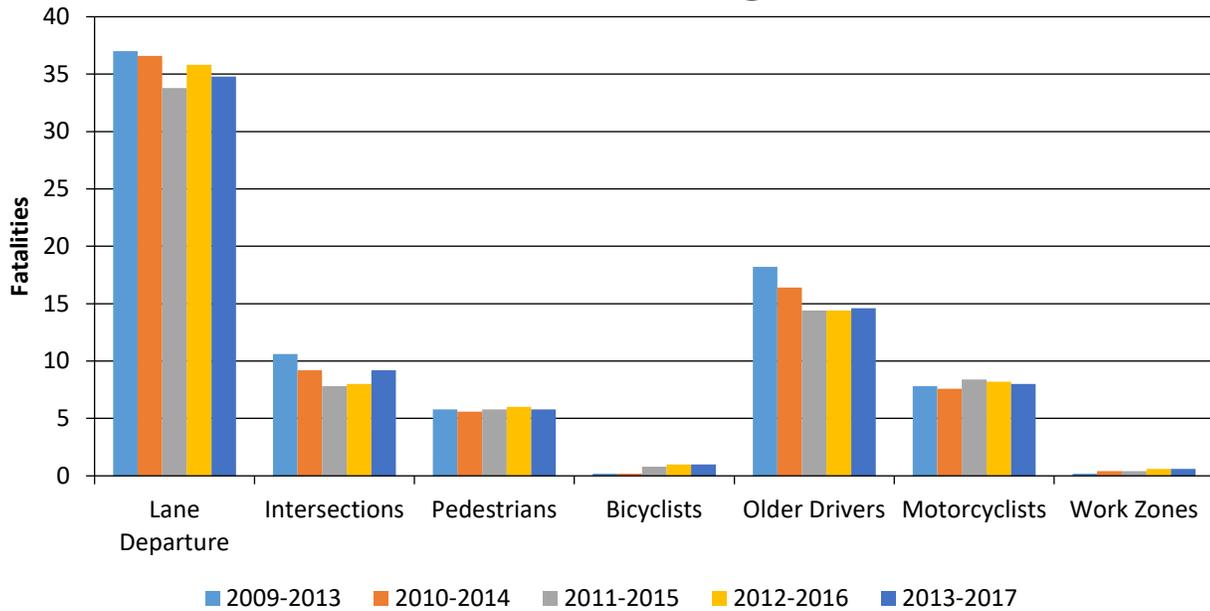
**Effectiveness of Groupings or Similar Types of Improvements**

**Present and describe trends in SHSP emphasis area performance measures.**

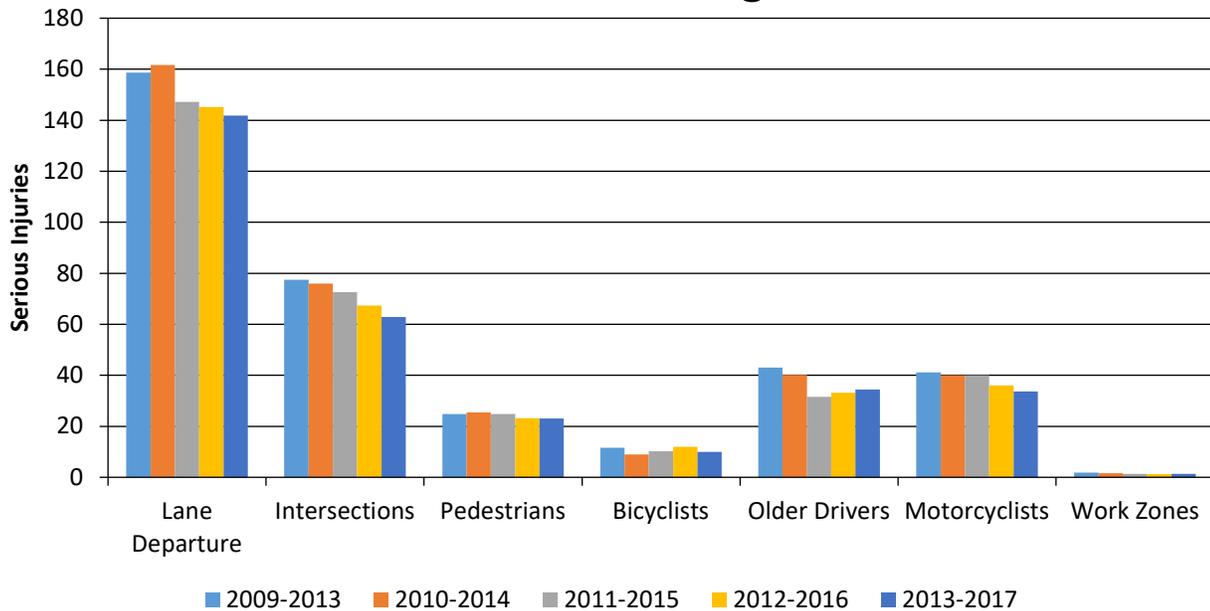
**Year 2017**

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)	Other 1	Other 2	Other 3
Lane Departure		34.8	141.8	0.48	1.96	0	0	0
Intersections		9.2	62.8	0.13	0.86	0	0	0
Pedestrians		5.8	23	0.08	0.32	0	0	0
Bicyclists		1	10	0.01	0.14	0	0	0
Older Drivers		14.6	34.4	0.2	0.47	0	0	0
Motorcyclists		8	33.6	0.11	0.46	0	0	0
Work Zones		0.6	1.4	0.01	0.02	0	0	0

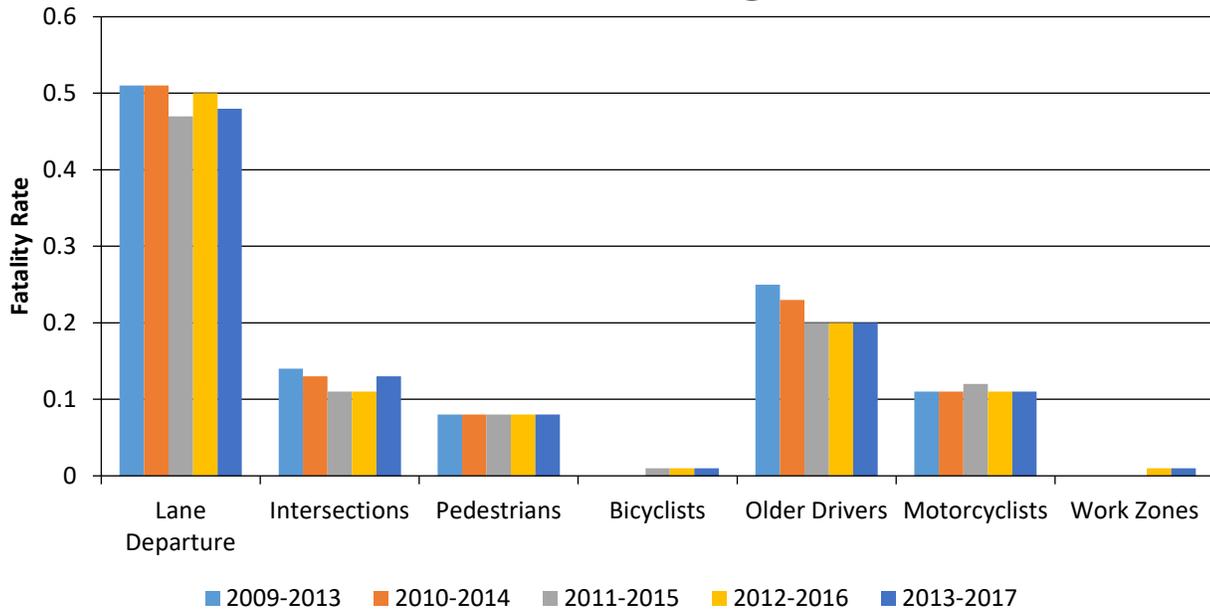
## Number of Fatalities 5 Year Average



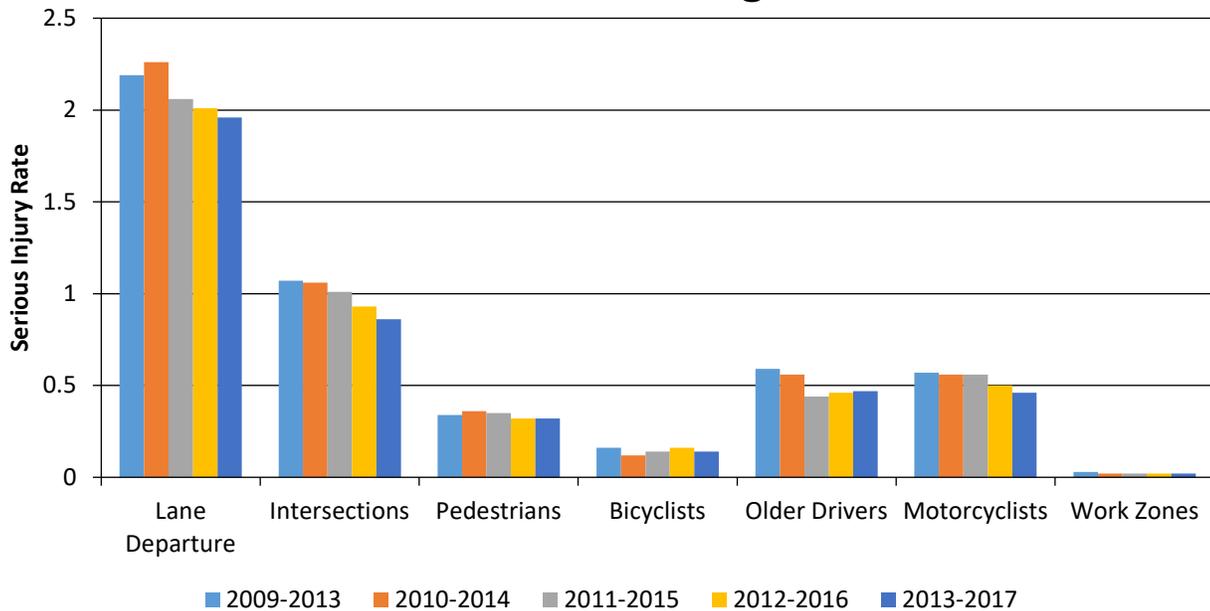
## Number of Serious Injuries 5 Year Average



## Fatality Rate (per HMVMT) 5 Year Average



## Serious Injury Rate (per HMVMT) 5 Year Average



**Enter additional comments here to clarify your response for this question or add supporting information.**

The following factors were considered when presenting the data.

2018 Vermont Highway Safety Improvement Program

Older Driver Emphasis Area: Occupants of ALL ages w/major injuries in all vehicles involved in a Major Crash whereby a 65+ YO operator was involved. Occupants of ALL ages w/fatal injuries in all vehicles involved in a Major Crash whereby a 65+ YO operator was involved.

Lane Departure: Includes Vehicle Collided With overturned, guardrail/curb, tree, pole./sign, ledge/boulder, and other fixed object and sequence of events Ran off Road and Overturned/rollover

Intersections: 4 way, T, Y, Circle/roundabout and 5 way

Motorcyclists: PlateType

Work Zones: Road Condition = work zone

**Has the State completed any countermeasure effectiveness evaluations during the reporting period?**

No

**Enter additional comments here to clarify your response for this question or add supporting information.**

No evaluations of countermeasures were performed during this reporting period. However, in May 2016, VTrans summarized crash data at roundabouts in Vermont. For each site, the same number of before and after crash data was used. Crashes were summarized by severity levels. No statistical analysis was performed. This was a simple before and after crash data analysis. The roundabouts included in this analysis included all known roundabouts in operation. Overall, there was a 5% reduction in the total number of crashes.

**Provide the following information for previously implemented projects that the State evaluated this reporting period.**

**Enter additional comments here to clarify your response for this question or add supporting information.**

**Are there any other aspects of the overall HSIP effectiveness on which the State would like to elaborate?**

Yes

**Describe any other aspects of HSIP effectiveness on which the State would like to elaborate.**

Of the seven emphasis areas identified in the SHSP, lane departure crashes and intersection crashes are the two areas that specifically relate to engineering and the HSIP.

The 2017-2021 SHSP has target reductions for intersection and lane departure major crashes that have been set at 10% of 2012 thresholds. In terms of numbers, this represents a five-year target of 72 major crashes for intersection crashes and a five-year average target of 186 major crashes for lane departure crashes.

The latest five-year average (2013-2017) for lane departure crashes is 153 major crashes, which is below the SHSP target of 186 major crashes.

For the emphasis area concerning intersections, the latest five-year average (2013-2017) is 62 major crashes. This five-year average is below the SHSP target of 72 major crashes at intersections.

## Compliance Assessment

**What date was the State’s current SHSP approved by the Governor or designated State representative?**

04/26/2017

**What are the years being covered by the current SHSP?**

From: 2017 To: 2021

**When does the State anticipate completing it’s next SHSP update?**

2022

**Enter additional comments here to clarify your response for this question or add supporting information.**

The 2017-2021 Strategic Highway Safety Plan was endorsed by Vermont Secretary of Transportation, Joe Flynn, on April 26, 2017. On May 16, 2017, FHWA Vermont Division Administrator, Matthew Hake, approved the process that was followed by Vermont to produce the 2017-2021 Strategic Highway Safety Plan.

The 2017-2021 SHSP can be viewed by clicking this link [http://vermonthighwaysafety.org/wp-content/uploads/2017/02/VTrans-SHSP-Report\\_Feb2017\\_FINAL.pdf](http://vermonthighwaysafety.org/wp-content/uploads/2017/02/VTrans-SHSP-Report_Feb2017_FINAL.pdf) .

The process for developing the next Strategic Highway Safety Plan will be initiated in 2021. The next Strategic Highway Safety Plan will be due in 2022 and will cover the period 2022-2026.

**Provide the current status (percent complete) of MIRE fundamental data elements collection efforts using the table below.**

MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
<b>ROADWAY SEGMENT</b>										
Segment Identifier (12)	100	100					100	100	100	100
Route Number (8)	100	100								
Route/Street Name (9)	100	100								
Federal Aid/Route Type (21)	100	100								
Rural/Urban Designation (20)	100	100					100	100		
Surface Type (23)	100	100					100	100		
Begin Point Segment Descriptor (10)	100	100					100	100	100	100
End Point Segment Descriptor (11)	100	100					100	100	100	100
Segment Length (13)	100	100								

2018 Vermont Highway Safety Improvement Program

MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
Direction of Inventory (18)	50	50								
Functional Class (19)	100	100					100	100	100	100
Median Type (54)	85	85								
Access Control (22)	100	100								
One/Two Way Operations (91)	100	100								
Number of Through Lanes (31)	100	100					0	0		
Average Annual Daily Traffic (79)	100	100					0	0		
AADT Year (80)	100	100								
Type of Governmental Ownership (4)	100	100					100	100	100	100
<b>INTERSECTION</b>										
Unique Junction Identifier (120)			90	90						
Location Identifier for Road 1 Crossing Point (122)			35	46						
Location Identifier for Road 2 Crossing Point (123)			3	5						
Intersection/Junction Geometry (126)			1	2						
Intersection/Junction Traffic Control (131)			25	0						
AADT for Each Intersecting Road (79)			25	25						
AADT Year (80)			25	25						
Unique Approach Identifier (139)			90	90						
<b>INTERCHANGE/RAMP</b>										
Unique Interchange Identifier (178)					100	100				
Location Identifier for Roadway at Beginning of Ramp Terminal (197)					100	100				
Location Identifier for Roadway at Ending Ramp Terminal (201)					100	100				

2018 Vermont Highway Safety Improvement Program

MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
Ramp Length (187)					100	100				
Roadway Type at Beginning of Ramp Terminal (195)					0	0				
Roadway Type at End Ramp Terminal (199)					0	0				
Interchange Type (182)					0	0				
Ramp AADT (191)					100	100				
Year of Ramp AADT (192)					100	100				
Functional Class (19)					100	100				
Type of Governmental Ownership (4)					100	100				
<b>Totals (Average Percent Complete):</b>	<b>96.39</b>	<b>96.39</b>	<b>36.75</b>	<b>35.38</b>	<b>72.73</b>	<b>72.73</b>	<b>77.78</b>	<b>77.78</b>	<b>100.00</b>	<b>100.00</b>

\*Based on Functional Classification

**Enter additional comments here to clarify your response for this question or add supporting information.**

Note that in this table, there are 0% values that should be read as NA, Not Applicable, as percentages do not apply.

Local Paved Roads - NA for state owned (locals own them all).

**Describe actions the State will take moving forward to meet the requirement to have complete access to the MIRE fundamental data elements on all public roads by September 30, 2026.**

In September 2016, VTrans also received a draft geodatabase template of the MIRE database that Rhode Island DOT is having built by Esri to give us a point of beginning as the assessment of MIRE moves forward.

Several data experts from different Agency of Transportation units met on June 11, 2017 to discuss the status of the MIRE FDEs data.

The group compiled a chart that shows what data the Agency currently had and what state the data was. Some of the MIRE FDEs data can be extracted by reconfiguring existing data sets. This group estimated that Vermont currently collected 80-90% of the necessary data elements required in the MIRE FDEs schema. Data is stored in GIS format in ArcSDE as features or event tables. Current data may not be stored in the MIRE schema and may require translation to meet MIRE requirements.

There are some MIRE FDEs that already exist on the federal aid system due to HPMS requirements, or existing collection to support other programs within VTrans. These can be updated and process to defined to meet the MIRE data schema within the short term. Intersection data and other segment data may take time to develop and require medium term, and AADT collection and data on the more rural local roads may be a longer-term process.

Some elements have not been collected on state and municipal highways, but there is coordination with regional planning commissions, who work directly with towns, cities, the gores and grant within Vermont. During the FFY 2019, the RPCs will be reviewing the existing MIRE FDEs and filling any gaps that may exist on functionally classed town highways and local roads within their regions. Due to the scope and scale of this effort, it may span several years to fully complete. Vermont does have federal highways, under several federal agencies, which will need to be coordinated to gain this data.

2018 Vermont Highway Safety Improvement Program

It is uncertain at this time to what extent the other agencies that own the roads will collect MIRE FDEs at this time and an assessment of this may be done as part of the planning process for the FDEs collection.

The largest missing data set in Vermont’s roadway data has been the intersection data. There was no single comprehensive system to identify all Vermont intersections and their corresponding traffic controls and associated elements, until this initiative and the development of an intersection database. The Agency has separate intersection databases for traffic counting and traffic signals, and the Mapping Section has been working to develop a database that leverages information from the systems, as well as including key MIRE data elements.

Some new intersection control data will require coordination with local communities and/or the Regional Planning Commissions to collect the needed data.

Vermont has developed a system having each intersection with a unique identifier that will permit to merge the existing numbering schemes from other systems within the Agency. This intersection schema has been the highest priority in VTrans ability to develop the intersection data layer.

During FFY2018, the Agency has been working with a consultant to develop an inventory of about 4000 state-to-state intersections on the federal aid system. The Agency has secured additional 405c funds from the Traffic Records Coordination Committee for FY2019 to complete the inventory of all other intersections on the federal aid system (about 12,000 intersections).

On a parallel track, the Mapping Section has been working internally to build out the intersection from existing data layers, such as AADT, intersecting road names, numbers and mile post references, and other data.

The group that met on June 11, 2017 identified the following potential schedule for completed an intersection database on the federal-aid system.

Develop intersection numbering system and database elements - (August - October 2017)

- Link other database numbering systems into new database - (September -October 2017)
- Collect Intersection data with temporary employees via Google Maps and or other similar databases. ( January -December 2018)
- Obtain the remainder of intersection data via field visits to sites that do not have a photo log option. ( January -December 2018)

Other tasks needed to comply with the 2026 deadline include:

Build on the July 11, 2017 meeting and preform a rigorous assessment of what exists, identify gaps and develop a data acquisition plan. The listing of the MIRE FDEs with collection status is in process of being developed as an inventory of existing data sources is being created across a series of sections within the Vermont Agency of Transportation.

Identify the technology and methodologies including GIS technology for collecting the MIRE FDEs.

Determine a process for data exchange with other agencies that will collect data.

Estimating the costs, levels of staffing, or resource requirements to collect the MIRE FDEs.

Identifying funding for the collection, storage, and maintenance of the MIRE FDE data.

**Provide the suspected serious injury identifier, definition and attributes used by the State for both the crash report form and the crash database using the table below. Please also indicate whether or not these elements are compliant with the MMUCC 4th edition criteria for data element P5. Injury Status, suspected serious injury.**

CRITERIA	SUSPECTED SERIOUS INJURY IDENTIFIER(NAME)	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY DEFINITION	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY ATTRIBUTES(DESCRIPTORS)	MMUCC 4TH EDITION COMPLIANT *
Crash Report Form	Suspected Serious Injury (A)	Yes	N/A	Yes	N/A	Yes
Crash Report Form Instruction Manual	Suspected Serious Injury (A)	Yes	Suspected Serious Injury (A) - (previously Injury – Incapacitating) is any injury, other than fatal, which results in one or more of the following: Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood Broken or distorted extremity (arm or leg) Crush injuries	Yes	Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood Broken or distorted extremity (arm or leg) Crush injuries Suspected skull, chest or abdominal injury other than bruises or minor lacerations Significant burns (second and third degree burns over 10% or more of the body)	Yes

2018 Vermont Highway Safety Improvement Program

CRITERIA	SUSPECTED SERIOUS INJURY IDENTIFIER(NAME)	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY DEFINITION	MMUCC 4TH EDITION COMPLIANT *	SUSPECTED SERIOUS INJURY ATTRIBUTES(DESCRIPTORS)	MMUCC 4TH EDITION COMPLIANT *
			Suspected skull, chest or abdominal injury other than bruises or minor lacerations Significant burns (second and third degree burns over 10% or more of the body) Unconsciousness when taken from the crash scene Paralysis		Unconsciousness when taken from the crash scene Paralysis	
Crash Database	Suspected Serious Injury (A)	Yes	N/A	Yes	N/A	Yes
Crash Database Data Dictionary	N/A	No	N/A	No	N/A	No

**Please describe the actions the State is taking to become compliant by April 15, 2019.**

Vermont does not have an overall crash data dictionary. The crash form instructions manual contains the definitions related to the fields listed on the form and this is what has been used mostly (NHSTA 2016 Traffic Records Assessment concluded that “while the WebCrash data dictionary alone did not contain the necessary information, when combined with the Investigator's Guide for Completing the State of Vermont Uniform Crash Report, all data elements and allowable values were covered in great detail.) As just mentioned, the developer of the crash database has a WebCrash data dictionary related to the system and we might be able to use it as a starting point for developing a comprehensive crash data dictionary.

**Enter additional comments here to clarify your response for this question or add supporting information.**

Vermont does not have a crash data dictionary. Definitions are listed in the Crash Report Form Instruction Manual.

**Did the State conduct an HSIP program assessment during the reporting period?**

No

**When does the State plan to complete it's next HSIP program assessment.**

2021

**Enter additional comments here to clarify your response for this question or add supporting information.**

HSIP FHWA Peer Review was last done in May 2016.

## **Optional Attachments**

Program Structure:

[FFY18 Systemic Local Road Safety.pdf](#)

[Vermont HSIP Manual February 19 2016.pdf](#)

[Vermont HSIP Low Cost Program October 2016.pdf](#)

Project Implementation:

Safety Performance:

Evaluation:

Compliance Assessment:

## Glossary

<b>5 year rolling average</b>	means the average of five individuals, consecutive annual points of data (e.g. annual fatality rate).
<b>Emphasis area</b>	means a highway safety priority in a State’s SHSP, identified through a data-driven, collaborative process.
<b>Highway safety improvement project</b>	means strategies, activities and projects on a public road that are consistent with a State strategic highway safety plan and corrects or improves a hazardous road location or feature or addresses a highway safety problem.
<b>HMVMT</b>	means hundred million vehicle miles traveled.
<b>Non-infrastructure projects</b>	are projects that do not result in construction. Examples of non-infrastructure projects include road safety audits, transportation safety planning activities, improvements in the collection and analysis of data, education and outreach, and enforcement activities.
<b>Older driver special rule</b>	applies if traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65 in a State increases during the most recent 2-year period for which data are available, as defined in the Older Driver and Pedestrian Special Rule Interim Guidance dated February 13, 2013.
<b>Performance measure</b>	means indicators that enable decision-makers and other stakeholders to monitor changes in system condition and performance against established visions, goals, and objectives.
<b>Programmed funds</b>	mean those funds that have been programmed in the Statewide Transportation Improvement Program (STIP) to be expended on highway safety improvement projects.
<b>Roadway Functional Classification</b>	means the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide.
<b>Strategic Highway Safety Plan (SHSP)</b>	means a comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.
<b>Systematic</b>	refers to an approach where an agency deploys countermeasures at all locations across a system.
<b>Systemic safety improvement</b>	means an improvement that is widely implemented based on high risk roadway features that are correlated with specific severe crash types.
<b>Transfer</b>	means, in accordance with provisions of 23 U.S.C. 126, a State may transfer from an apportionment under section 104(b) not to exceed 50 percent of the amount apportioned for the fiscal year to any other apportionment of the State under that section.