



The High Risk Rural Roads Program in the Delaware Valley

August 2011

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The symbol in our logo is adapted from the official

DVRPC seal and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

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Executive Summary

Approximately two-thirds of all United States traffic fatalities recorded during 2010 occurred on rural roads. In an effort to address the rural road crash problem, the Federal Highway Administration implemented the High Risk Rural Roads (HRRR) Program to specifically target reducing rural road fatalities.

This report serves as a primer on the HRRR Program by providing the federal, state, and local perspectives on the program, and discusses its implementation within the Delaware Valley Regional Planning Commission's (DVRPC) nine-county bi-state planning area. Strict criteria must be met in order for HRRR Program funds to be utilized, and those criteria are addressed differently by each of the DVRPC's state partners. In the following pages both New Jersey and Pennsylvania's approaches are discussed highlighting differences and outcomes.

As with many government-funded programs, there are detailed requirements that must be understood in order to utilize the funds. This document is an attempt to summarize clearly and concisely why the program is important, what is needed to access the funds, how the process is being handled within the DVRPC region, and what role the DVRPC is playing in the process.

Introduction

Overview of Federal Program

The Highway Safety Improvement Program (HSIP) provides federal funding for projects included in State Strategic Highway Safety Plans that correct or improve a hazardous road location or feature, or other highway safety problem. The HSIP was codified as Section 148 of Title 23, U.S.C., (23 U.S.C. §148), and was elevated to a core program as a result of the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Public Law 109-59. The HSIP emphasizes a data-driven, strategic approach to improving highway safety that focuses on results. Substantiating the data to support improvements and demonstrate the effectiveness of countermeasures is crucial to the program.

The SAFETEA-LU also introduced a new set-aside provision known as the High Risk Rural Roads Program (HRRRP), codified as 23 U.S.C. §148 (f). The HRRRP Program represents a significant step toward recognizing the need to reduce fatalities on rural roads, which account for almost two-thirds of the over 36,000 annual roadway fatalities in the U.S. In order to make headway in reducing fatalities and serious injuries, safety on rural roads must be improved, regardless of ownership.

What is a rural road in the DVRPC region? The criteria for rural roads may vary, but in general these roads typically traverse farmland, forests or other natural areas, and lands outside of urbanized areas where population and development density is low. Although this may sometimes include interstate facilities, in the DVRPC region, "rural" refers to lower volume routes with the federal functional classification of rural.

Roadway ownership in the DVRPC region is divided between the state, counties, and municipalities in New Jersey, and between the state and municipalities in Pennsylvania. From a statewide perspective, in New Jersey the State owns and operates about 2,400 miles of roadway, the counties about 7,000 miles, and municipalities about 29,000 miles. In Pennsylvania, the State owns about 40,000 miles of roadway, and municipalities about 77,000 miles of roadway. The only exception is that some Pennsylvania counties have a small number of roadway miles under their jurisdiction with Montgomery County having the most in the DVRPC region at 70 miles.

Table 1: Pennsylvania Road Miles and Ownership

| County | State Owned | Local Owned |
|-------------------------|-------------|-------------|
| Bucks | 960.0 | 2456.2 |
| Chester | 1021.9 | 2476.7 |
| Delaware | 448.3 | 1346.3 |
| Montgomery | 768.7 | 2798.6 |
| Philadelphia | 360.5 | 2213.4 |
| 5-County total | 3559.4 | 11291.2 |
| | | |
| Total statewide: | 39,861.3 | 77,325.6 |

Source:

ftp://ftp.dot.state.pa.us/public/pdf/BPR_PDF_FILES/Documents/Traffic/Highway_Statistics/Annual_Report/2009/Mileage-Jurisdiction.pdf

Table 2: New Jersey Road Miles and Ownership

| County | State Owned | County Owned | Local Owned |
|-------------------------|-------------|--------------|-------------|
| Burlington | 156 | 500 | 2,079 |
| Camden | 102 | 376 | 1,525 |
| Gloucester | 152 | 400 | 1,042 |
| Mercer | 119 | 172 | 1,226 |
| 4-County total | 529 | 1448 | 5,872 |
| | | | |
| Total statewide: | 2,324 | 6,439 | 29,020 |

Source: http://www.state.nj.us/transportation/refdata/roadway/pdf/hpms2009/njprmbj_09.pdf

High Risk Rural Roads Program Interim Guidance¹

The HRRR Program is a component of the HSIP and its funding is a sub-allocation, which means that the HRRR funds are set aside before HSIP funds are apportioned to the States according to the standard formula (see page 8). The HRRR Program provides \$90 million per year nationally for HRRR safety improvement projects. Projects may be selected on any public HRRR to correct or improve hazardous road locations or features, as long as the data analysis confirms the problem at the selected location and appropriate countermeasures are identified. The State's HSIP, including the HRRR element, shall consider the safety needs on all public roads, whether state or locally owned. A public road is defined by 23 U.S.C. §101(a)(27) as "...any road or street under the jurisdiction of and maintained by a public authority and open to public travel."

¹ <http://safety.fhwa.dot.gov/safetealu/memos/memo051906.cfm>

Definition of HRRR

Specific criteria required for a road to qualify as a HRRR are defined by 23 U.S.C. §148(a)(1). States are required to identify these roadways (and expend the HRRR funds) according to the following definition:

- "...any roadway functionally classified as a rural major or minor collector or a rural local road
1. on which the accident rate for fatalities and incapacitating injuries exceeds the statewide average for those functional classes of roadway; or
 2. that will likely have increases in traffic volume that are likely to create an accident rate for fatalities and incapacitating injuries that exceeds the statewide average for those functional classes of roadway."

The Relationship Between HSIP and HRRR Program

The HSIP is a core Federal aid highway program and is intended to achieve significant reductions in traffic fatalities and serious injuries on public roads through the implementation of infrastructure-related highway safety improvements. The HSIP includes a requirement for states to develop Strategic Highway Safety Plans (SHSPs) in consultation with other key state and local highway safety stakeholders. A formalized HSIP process has been established by the Federal Highway Administration (FHWA), which consists of processes for planning, implementation, and evaluation. It involves four basic steps – analyze the data, identify appropriate countermeasures, prioritize and select projects, and evaluate results. The HRRR Program is a component of the HSIP and supports road safety program efforts through the implementation of construction and operational improvements on high risk rural roads. The HSIP, including the HRRR element, must consider all public roads.

HSIP funds may be used for planning, development and operation of a system for managing highway safety and for data improvements as they relate to the State Highway Safety Improvement Program. HRRR funds, however, may only be used for construction and operational improvements on high risk rural roads. There is an exception that allows a state to use HRRR funds for other safety improvements, if and only if the State certifies that it has met all of its needs for construction and operational improvements on high risk rural roads. In addition, as long as the project will ultimately involve a construction or operational improvement which is identified as part of a State's HSIP process, HRRR funds may be used for preliminary engineering, including environmental approvals and final design.²

Examples of construction and operational improvements eligible for HSIP funding may include, but are not limited to, those found in 23 U.S.C. §148(a)(3)(B) (see Table 3 for this list). [Note: Some items, as noted in the table, are not eligible for funding under the HRRR provision because they are not construction and operational improvements.]

² http://safety.fhwa.dot.gov/safetealu/qa/qa_programarea.cfm#toc118108107

Table 3: Sample List of Construction and Operational Improvements

| HSIP-Eligible Highway Safety Improvement Strategies |
|--|
| An intersection safety improvement. |
| Pavement and shoulder widening (including addition of a passing lane to remedy an unsafe condition). |
| Installation of rumble strips or another warning device, if the rumble strips or other warning devices do not adversely affect the safety or mobility of bicyclists, pedestrians, and the disabled. |
| Installation of a skid-resistant surface at an intersection or other location with a high frequency of accidents. |
| An improvement for pedestrian or bicyclist safety or safety of the disabled. |
| Construction of any project for the elimination of hazards at a railway-highway crossing that is eligible for funding under section 130, including the separation or protection of grades at railway-highway crossings. |
| Construction of a railway-highway crossing safety feature, including installation of protective devices. |
| The conduct of a model traffic enforcement activity at a railway-highway crossing. (NOT eligible under HRRRP). |
| Construction of a traffic calming feature. |
| Elimination of a roadside obstacle. |
| Improvement of highway signage and pavement markings. |
| Installation of a priority control system for emergency vehicles at signalized intersections. |
| Installation of a traffic control or other warning device at a location with high accident potential. |
| Safety-conscious planning. (NOT eligible under HRRRP) |
| Improvement in the collection and analysis of crash data. (NOT eligible under HRRRP) |
| Planning integrated interoperable emergency communications equipment, operational activities, or traffic enforcement activities (including police assistance) relating to workzone safety. (Only "operational activities relating to workzone safety" are eligible under HRRRP; "Planning integrated interoperable emergency communications equipment and traffic enforcement activities relating to workzone safety" are NOT eligible under HRRRP). |
| Installation of guardrails, barriers (including barriers between construction work zones and traffic lanes for the safety of motorists and workers), and crash attenuators. |
| The addition or retrofitting of structures or other measures to eliminate or reduce accidents involving vehicles and wildlife. |
| Installation and maintenance of signs (including fluorescent, yellow-green signs) at pedestrian-bicycle crossings and in school zones. |
| Construction and yellow-green signs at pedestrian-bicycle crossings and in school zones. |
| Construction and operational improvements on high risk rural roads. |

Source: 23 U.S.C. Section 148(a)(3)(B)

Process

As States implement the HRRR Program, FHWA has provided guidance about two vital steps associated with the process:

1. Identify eligible roadways; and
2. Analyze the highway safety problem with available tools and information.

Specific guidance from FHWA related to each step is outlined below.³

STEP ONE: Identify Eligible Roadways

As stated in SAFETEA-LU, eligible roadways must have crash rates that exceed the statewide average for the respective roadway functional classifications. States should use two types of data in identifying roadways that exceed the statewide average rate for fatalities and incapacitating injuries: crash data (e.g. fatalities and incapacitating injuries), and exposure data [e.g. vehicle miles traveled (VMT), average daily traffic (ADT), lane miles, etc.]. Within the limits of the law, States have a great deal of flexibility in identifying eligible roadways. Regardless of the measures used, federal guidance emphasizes that States should focus on data-driven methods.

Other State or local fatal and injury data sources that may provide information on the severity of injuries resulting from crashes may also be used. Examples of such data sources include: emergency medical services (data on severity of injuries sustained in a crash); enforcement agencies (data related to the overall severity of a crash); and hospitals (data related to the end result of injuries sustained). If these data sources are used, the information should be linked to the location of the crash on the respective roadway functional classification.

National data, such as the Fatality Analysis Reporting System (FARS) that provides data on crashes involving traffic-related fatalities, may be used as well. FARS data can be sorted by roadway functional classification (rural major and minor collectors, and rural local roads); however, the specific roadway location for the data cannot be determined.

States with comprehensive statewide crash and roadway data systems should have the ability to identify necessary exposure data by roadway functional classification on all public roads on the respective roadway functional classifications (rural major and minor collectors, and rural local roads) and determine accurate crash rates. Examples of exposure data to develop a rate include:

- ◆ vehicle miles traveled (VMT)
- ◆ average daily traffic (ADT)
- ◆ lane miles
- ◆ number of vehicles entering an intersection

A state may consider the relationship between population or other per capita data (e.g. registered vehicles, licensed drivers, etc.), and the number of fatalities and incapacitating injuries of a defined area to determine fatality and incapacitating injury rates.

National data, such as the Highway Performance Monitoring System and the FHWA's Highway Statistics, may be used to provide roadway data that is derived from State data. Like FARS, this

³ Source: <http://safety.fhwa.dot.gov/safetealu/memos/memo051906.cfm>

data may be sorted by roadway functional classification; however, the specific roadway location for the data cannot be determined.

The second part of the HRRR provision of SAFETEA-LU [23 U.S.C. §148(a)(1)(B)] addresses those roads that will likely have increases in traffic volume that may result in an accident rate for fatalities and incapacitating injuries exceeding that of the statewide average. States are encouraged to work closely with local planners to identify such roads. For instance, in determining the projected rates, among other resources and methods, States may use specific growth projection patterns as identified by the respective Metropolitan Planning Organizations, city/county planning organizations, and growth management organizations to assist with identifying HRRRs.

STEP TWO: Analyze the Highway Safety Problem with Available Tools and Information

States with comprehensive roadway and crash data systems may use existing data and analysis capabilities to define the problems and select projects. Once potential locations are identified, the data should be analyzed in more detail to diagnose safety concerns, identify potential countermeasures, and make final project selections.

Examples of data sources that may be used to analyze highway safety problems include, but are not limited to, the following:

- ◆ Other state- or local-based project ranking processes that use appropriate crash data
- ◆ Methods that consider other data reflective of fatalities and incapacitating injuries, such as:
 - Prioritized projects resulting from Road Safety Audits
 - Corridor analyses that identify systematic safety improvements. For instance, where crash and/or roadway data suggest that many crashes occur given a certain type of roadway feature, a State may systematically implement an appropriate countermeasure that would improve safety conditions on the respective roadways. (e.g. signs, pavement markings, rumble strips, horizontal curve treatments, etc.).

Funding

The HRRR Program set-aside for each State is calculated using the same formula that is used for the HSIP apportionments: total lane miles of Federal-aid highways, total vehicle miles traveled (VMT) on lanes on the Federal aid highways, and number of fatalities on the Federal-aid system.

The amount available for the HRRR Program will be calculated by the FHWA each year after apportionment of the overall HSIP funds. Although \$90 million is set aside specifically for the

HRRR Program, States may use their discretion to expend HSIP funds on rural roads if such roads emerge as a safety need in the Strategic Highway Safety Plan.⁴

Highway safety funds are available for obligation in the fiscal year for which they are apportioned plus three additional fiscal years. After that point, the funds lapse and are no longer available for obligation. For example, FY 2006 HSIP funds apportioned to the States would lapse if not obligated by September 30, 2009.

⁴ Source: <http://safety.fhwa.dot.gov/safetealu/guides/guide040506.cfm>

State Programs in the DVRPC Region

Pennsylvania

In Pennsylvania, safety planning and engineering is managed by PennDOT's Bureau of Highway Safety and Traffic Engineering (BHSTE). At times, BHSTE has encountered challenges to spending HRRR Program dollars. For example, a project was recently proposed in District 3-0 that involved identifying some HRRRs and replacing old, non-standard cable guide rail as well as addressing unshielded bridge ends. However, since analysis of the routes did not show fatal or incapacitating injuries, the routes were not eligible for the funds. PennDOT has found this situation to be a problem statewide. Often, the volumes on these routes are relatively low, which frequently means that the number and rate of crashes are low. There is some hope that in PennDOT District 6-0 (which includes Bucks, Chester, Delaware, Montgomery, and Philadelphia counties) there may be a better chance that these routes would be eligible, since the volumes are likely to be higher.⁵

There is not a coordinated HRRR Program in Pennsylvania at this time. Pennsylvania receives close to \$3 million each year for this program. There is currently about \$6 million of unobligated HRRR funds in the state.

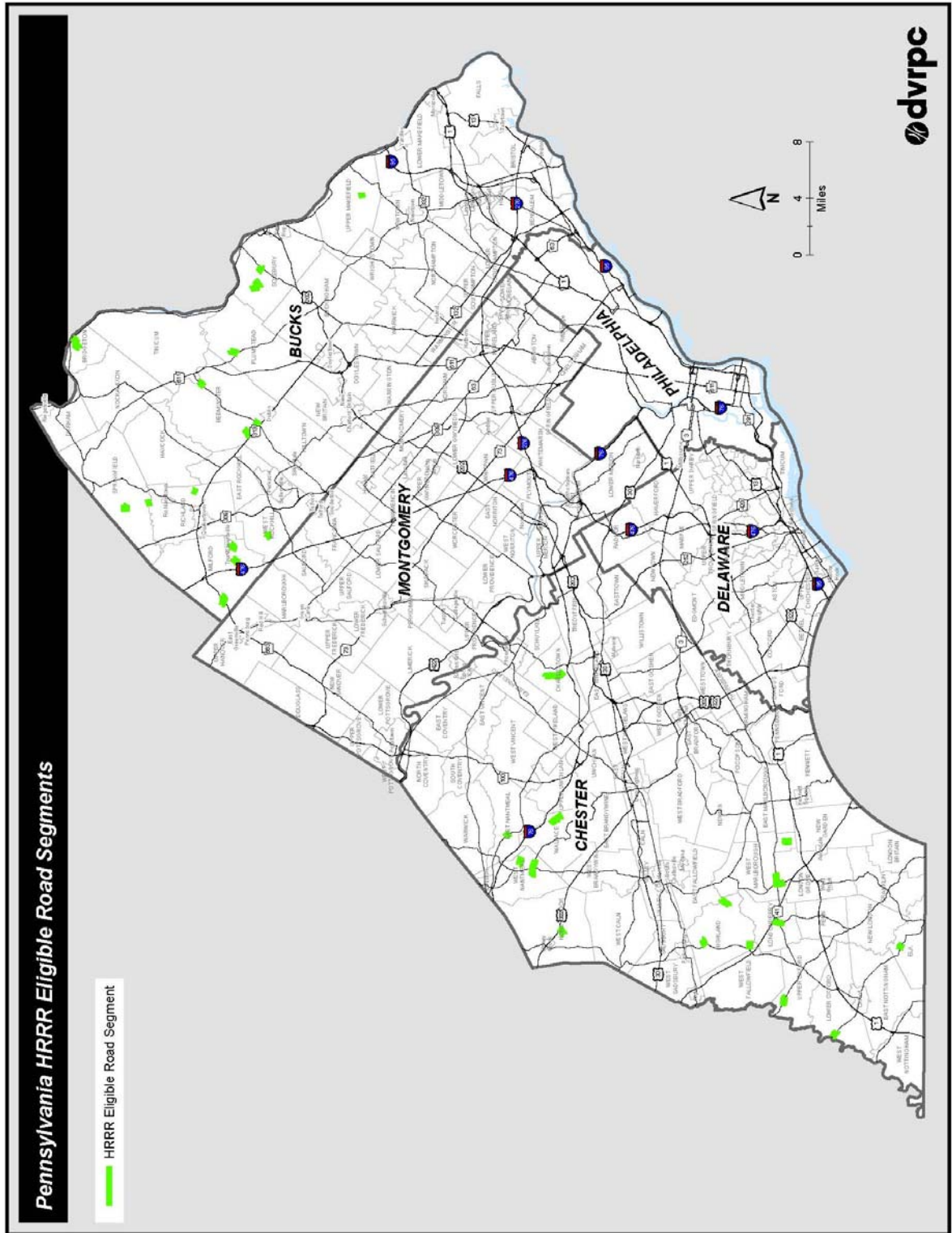
Pennsylvania's Identified HRRR Segments in the DVRPC Region

In an effort to assist with spending HRRR Program funds, BHSTE developed a priority list of eligible rural road segments for consideration in the HRRR Program and made this list available to partners in September of 2010. During the summer of 2010, BHSTE completed an analysis of rural road crashes statewide which resulted in a list of 365 locations across the state which meet federal HRRR Program guidelines. The following text summarizes the process.

- ◆ Identified all roadway segments functionally classified as a rural major or minor collector or a rural local road (function class 7, 8 or 9) that sustained at least one fatal or injury crash over the last 5 years (2005 – 2009). This step resulted in 14,981 segments statewide.
- ◆ To meet the federal requirements, the 14,981 locations were then limited to segments that have a higher than average fatal/major injury crash rate. This resulted in 2,079 statewide segments.

⁵ Email from Mike Castellano, FHWA Pennsylvania Division Office.

Figure 1: Pennsylvania HRRR Eligible Road Segments



- ◆ The list of 2,079 segments was then filtered further down to include only those that included at least one moderate injury crash and at least one minor injury crash. This additional requirement ensures that our HRRR candidate locations are not just the result of a few random fatal crashes but also have sustained a high number of injury crashes. The resulting final list of 356 segments statewide is a more select group of high risk segments suitable for a rural road safety project.

This procedure resulted in the identification of 38 HRRR eligible segments in two of the DVRPC's five Pennsylvania counties:

- ◆ Bucks – 18
- ◆ Chester – 20

Each of these segments are between 0.38 and 0.71 miles long, with Average Daily Traffic (ADT) volumes as low as 336 and as high as 6469. Six of these road segments were the site of a fatal crash, with two fatals occurring on one segment. Considering statewide rank, eight locations are within the top 100, the highest being number 36.

New Jersey

Staff at NJDOT Bureau of Safety Programs have been working with staff from Rutgers University to research HRRR Program best practices in other states. This research was intended to help develop a guideline for the Metropolitan Planning Organizations (MPOs) that might also provide standard specifications for countermeasure applications.

NJDOT was provided with a spreadsheet compiling policies and practices for centerline and edge line rumble strip applications in other states. After reviewing these materials, NJDOT staff set up a meeting with DVRPC and the other two MPOs in New Jersey to develop a strategy and action plan for the next round of HRRR solicitations. The goal was to receive solicitations for projects that aligned with FHWA's goals for the program.⁶

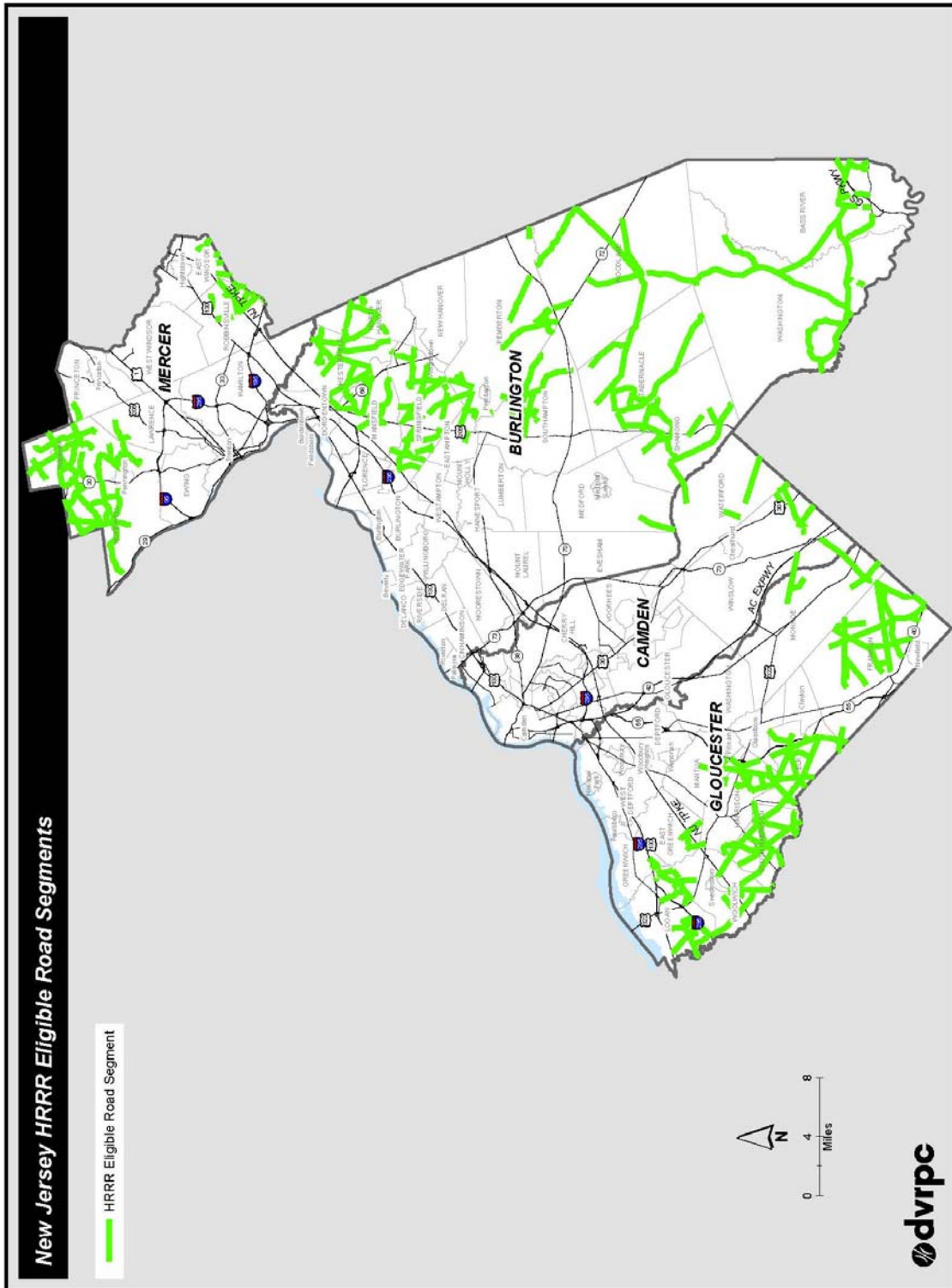
New Jersey's Identified HRRR Segments in the DVRPC Region – January 2010

NJDOT collaborated with the Rutgers University Center for Advanced Infrastructure and Transportation (CAIT), Transportation Safety Resource Center to identify funding eligible HRRR roadway segments in New Jersey.⁷ The analysis involved dividing out all rural road segments by functional class, speed, number of lanes, and presence of shoulders, then calculating a crash rate for each distinct rural road cross-section type according to that criteria. To ensure identification of the most severe rural road segments, a severity ranking was incorporated to prioritize higher severity road segments. The ranking assigned a five to fatal crashes and a one to property damage-only crashes, with the remaining three injury categories falling between according to severity.

⁶ Email from Kevin Conover, NJDOT Bureau of Safety Programs.

⁷ Email from Sarah Weissman, EIT Program Manager, Transportation Safety Resource Center.

Figure 2: New Jersey HRRR Eligible Road Segments



The analysis results were then sorted by metropolitan planning organization and an average crash rate per cross-section type was calculated. This allowed each identified segment to be evaluated against regional averages for context. This final analysis piece was used by MPOs to determine if an individual segment was above or below the MPO region average for that particular cross-section type.

NJ's Identified HRRR Segments in the DVRPC Region

This procedure resulted in the identification of 252 HRRR eligible segments among the DVRPC's four New Jersey counties:

- ◆ Burlington – 106
- ◆ Camden – 5
- ◆ Gloucester – 78
- ◆ Mercer – 63

The majority of these segments are between 0.1 and 2.0 miles long with a handful even shorter than that. Approximately 17 percent of the segments are between two and ten miles long. The varying length of the road segments are the result of varying cross-section lengths and the associated concentration of crash data. Fifteen out of the 252 road segments were the site of a fatal crash, with two fatals occurring on one segment. The New Jersey analysis does not include a statewide rank.

Future of the High Risk Rural Roads Program

Until a marked decline in traffic fatalities on rural roads is realized, it is anticipated that rural road safety will continue to be a priority concern at both the state and federal levels. The HRRR Program is the federal government's first program targeted specifically at identifying rural road problem locations and implementing appropriate engineering strategies.

Recognizing the need for improved rural road safety, Representative Michael H. Michaud (D-Maine) introduced the High Risk Rural Roads Safety Act on June 3, 2011. The goal of this bill is to grow the amount of dedicated funding currently available for high risk rural roads and make it easier for rural states to invest in road safety measures which will reduce fatal crashes.

Rep. Michaud's inspiration comes from the fact that rural road fatalities in his home state represent 90 percent of Maine's annual traffic fatalities, and in some New England states the number has grown between 2009 and 2010. Michaud's High Risk Rural Roads Safety Act of 2011 would address these problems by increasing the authorization amount from \$90 million per year nationally to \$400 million per year. Another very important change—changing the definition of a high risk rural road—would make the funding easier to access. This new legislation would continue to promote low-cost safety measures such as improved signs, pavement markings, and guardrail and cable barrier installation which are all generally low cost and have proven effectiveness.

The bill was also endorsed by the Roadway Infrastructure Safety Coalition (RISC). The RISC is one of the country's only national coalitions dedicated to roadway safety infrastructure on rural roads.

Whether or not this bill becomes law, the effort underlines the importance of rural road safety and its support at both the state and national levels.

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Abstract: This report summarizes the High Risk Rural Roads Program (HRRR Program), a federally funded safety improvement initiative designed to target rural roadway segments meeting specific safety criteria. The HRRR Program represents a significant step toward recognizing the need to reduce fatalities on rural roads, which account for almost two-thirds of the over 36,000 annual roadway fatalities in the US. This document explains the initiative from its conception at the federal level to its implementation at the state and local levels within the four New Jersey counties and five Pennsylvania counties of the Delaware Valley Regional Planning Commission's planning area.

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