

WYDOT Highway Condition Report

November 2015

Introduction

WYDOT's highway assets are managed through an **asset management system** comprised of the **pavement, bridge, and safety** management systems. These systems assist in prioritizing and programming highway construction projects to optimize the performance of Wyoming's transportation system.

Based on the forecasts of the management systems, an additional \$62 million per year (\$32 million for highways and \$30 million for bridges) is needed to maintain the transportation system in its current condition.

The following is a summary of system operation, recent developments, and use of the asset management systems to identify the conditions of the assets and aid in developing the strategies and highway construction projects identified in the State Transportation Improvement Program (STIP).

Wyoming's highways are divided into three categories: **Interstates**, which are high-speed, controlled-access four-lane highways; **National Highway System (NHS)** routes, typically two-lane roadways which are designated as important to the nation's economy, defense and mobility; and **non-NHS highways**, which are other state highways.

Maps showing the Wyoming highways in each of these categories and their current and projected conditions are provided at the end of this report.

I. Pavement Management

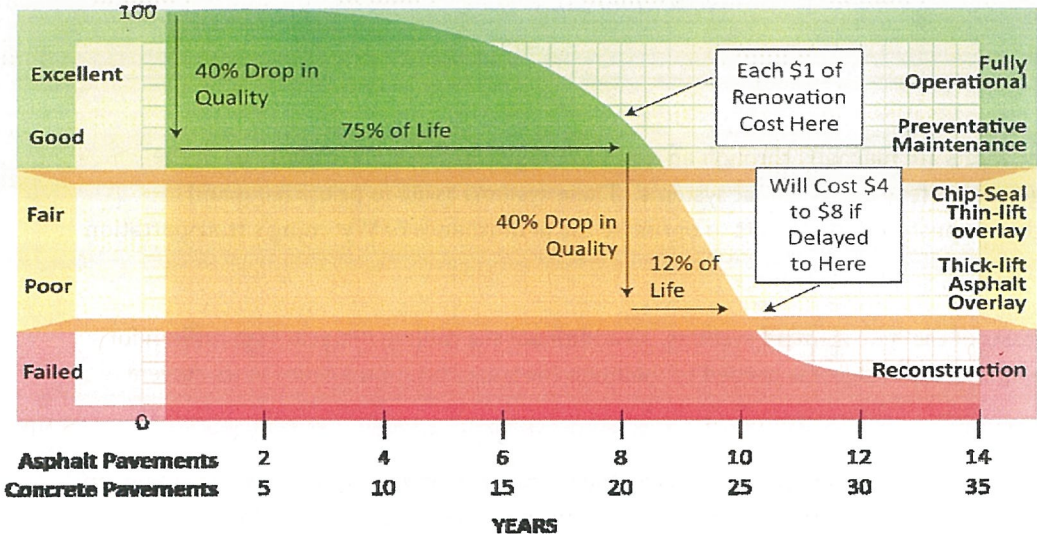
The WYDOT pavement management system stores data and performs analyses and evaluations of pavement sections. Data includes ride quality, rut depth, surface distress cracking, and friction of each section. New data is collected for the entire highway network on a two-year cycle.

Pavement condition ratings are based on a composite index of the above, and provide a relative comparison between road sections. Highways are classified as **excellent, good, fair, or poor** based on the index.

The pavement management system utilizes annual budgets, available funding, and typical project costs to recommend the most cost effective, timely, construction strategies on the selected roadways. The effect of inflation is also incorporated in the analysis. The overall condition of the highway system is optimized based on a cost-to-benefit scenario.

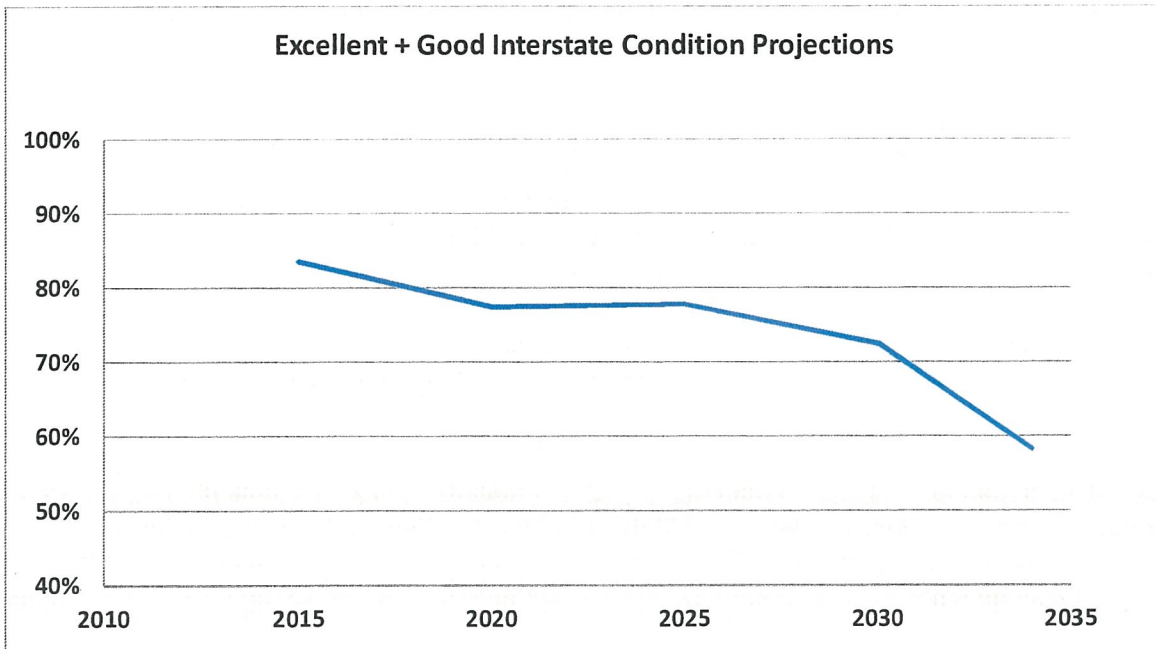
Future conditions of each highway section can be predicted using pavement performance models which graph condition versus time. Graphs, similar to that below, are used within the computer models to determine the annual change in the condition of any roadway.

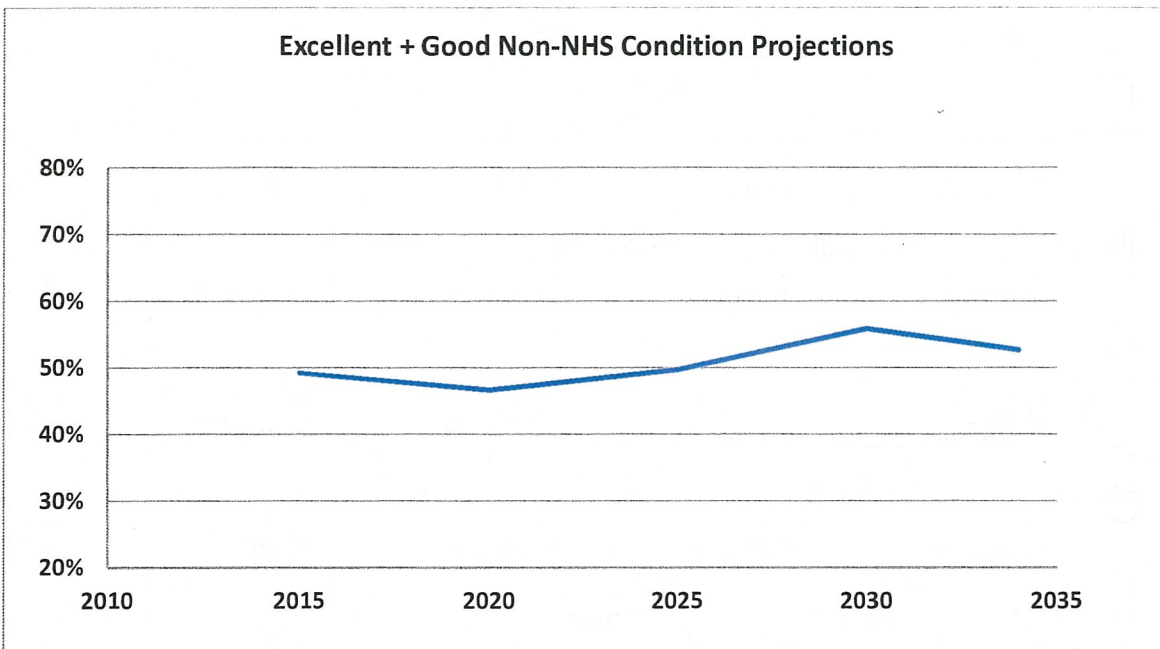
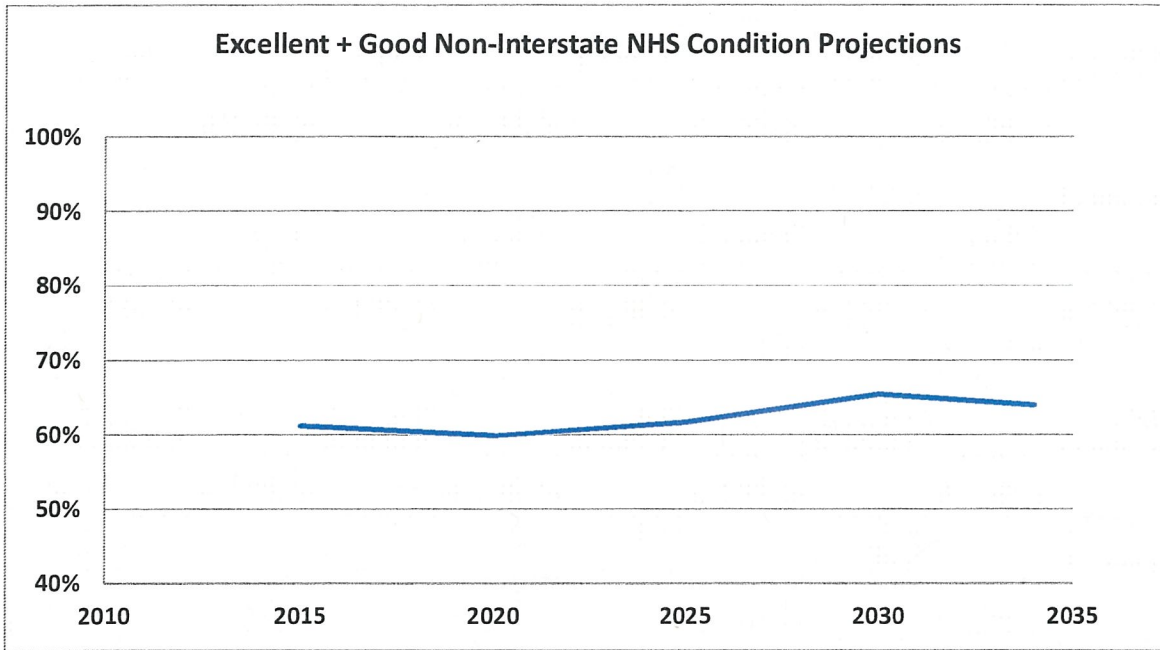
Pavement Performance Model



Pavement Preservation

WYDOT recognized that, based on the funding constraints and rising construction costs, the historic mix of projects within the STIP would result in an unacceptable condition of the transportation system and implemented a pavement preservation philosophy. This strategy is a result of numerous computer simulations or scenarios which predict the condition of the highway system.





The basic theory of pavement preservation is to maintain existing pavements through timely rehabilitation strategies and limit the more costly reconstruction projects which might occur near the end of the roadway's life.

Pavement Management: Effective Resource Distribution

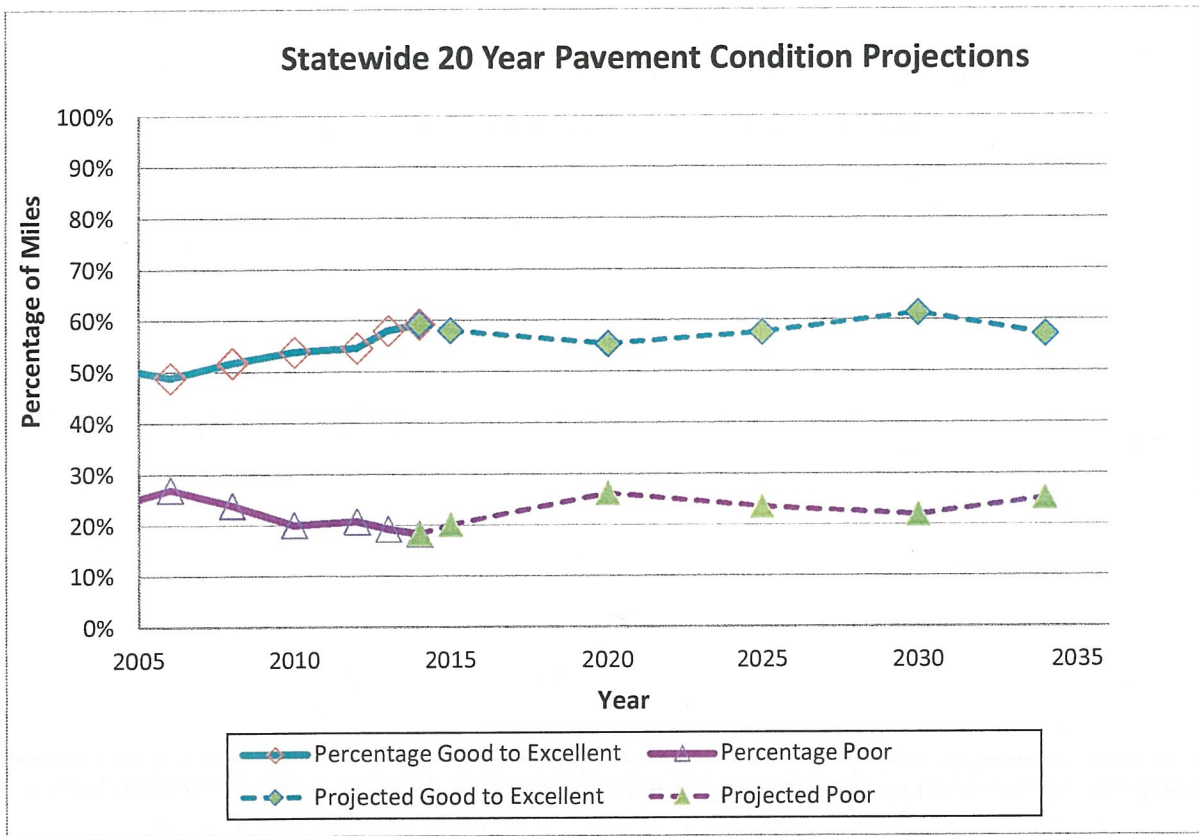
The pavement management system is used to objectively distribute pavement rehabilitation funding on a statewide basis. This is achieved using a formula that considers the total roadway miles, total traffic, and the total of all pavement needs within the district without an overall funding limitation.

The unconstrained pavement needs help determine the appropriate funding for each roadway treatment strategy, and based on the optimal scenario, each year a minimum number of miles must be completed utilizing the preventive maintenance, minor rehabilitation, and major rehabilitation strategies.

Additional State Funds

In 2013, WDYOT received additional funding from the state to assist in the maintenance of the state's infrastructure. The state fuel tax was increased from \$0.14 per gallon to \$0.24 per gallon, generating an estimated \$47.5 million per year in tax revenue for the maintenance of the state highway system. The general fund apportionment to WYDOT is \$23 million.

Legislative intent was followed in applying these funds to the pavement management scenarios. \$23 million general fund appropriation was applied only to state highways. \$40 million of the additional fuel tax funding was applied to the pavements on non-interstate highways, and was split between highways on and off the NHS based on traffic levels. The remaining \$7.5 million of fuel tax funding was used to enhance the condition of the state's bridges.



The desired goal of pavement management is to **maintain current pavement conditions** over a 20-year period. The previous graph shows the pavement management system's prediction of the state's roadway condition. A series of maps for the state-owned and state-maintained interstate, non-interstate NHS, and non-NHS systems are included at the end of this document. These maps depict the routes included in each

system, the current condition of the pavement, the condition of the pavement in 5 years based on those projects in the STIP, and the predicted condition in 10 years based on the projects selected by the pavement management system.

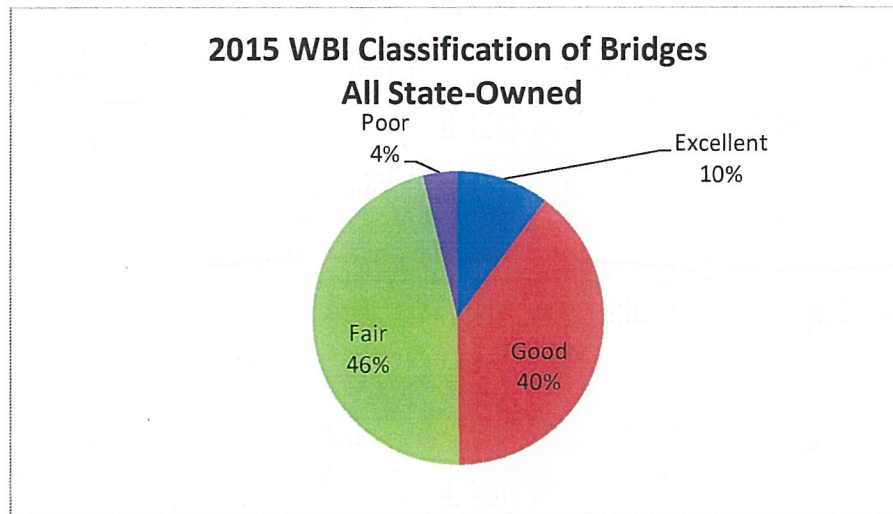
Funding Needed to Maintain Current Condition

Given current funding levels and anticipated funding splits between highway classifications into future years, WYDOT's pavement management system estimates an annual shortfall of \$32 million to maintain the highways in the present condition, if all current funding is perpetuated. This does not consider costs for bridge or safety needs, or costs due to increased pavement wear that could result from increased traffic due to economic or energy development activities.

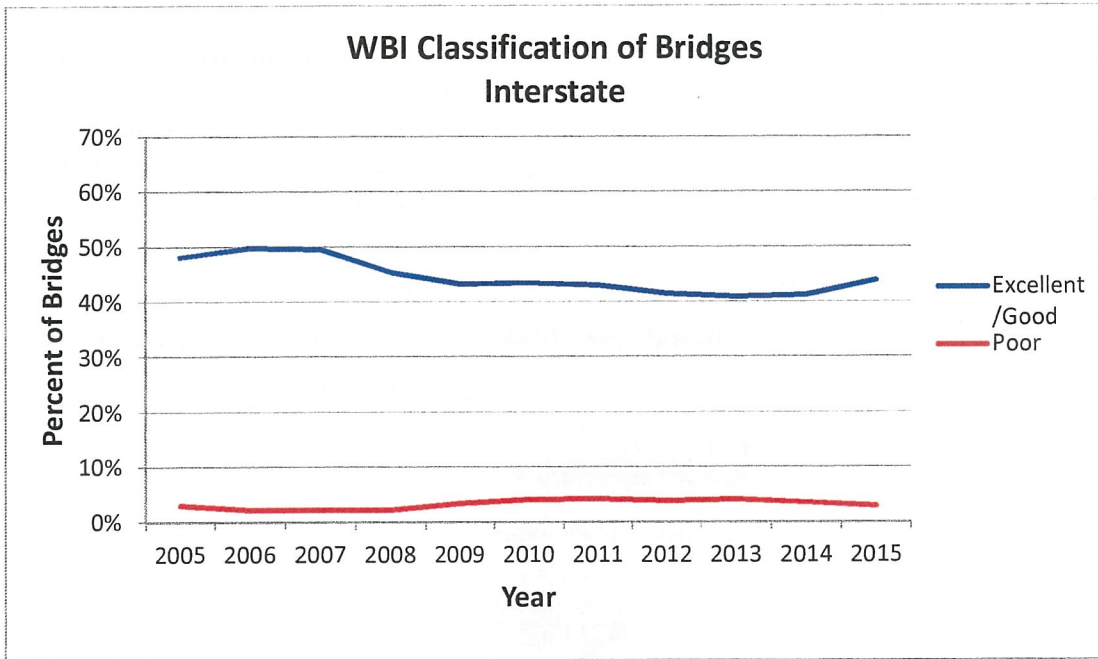
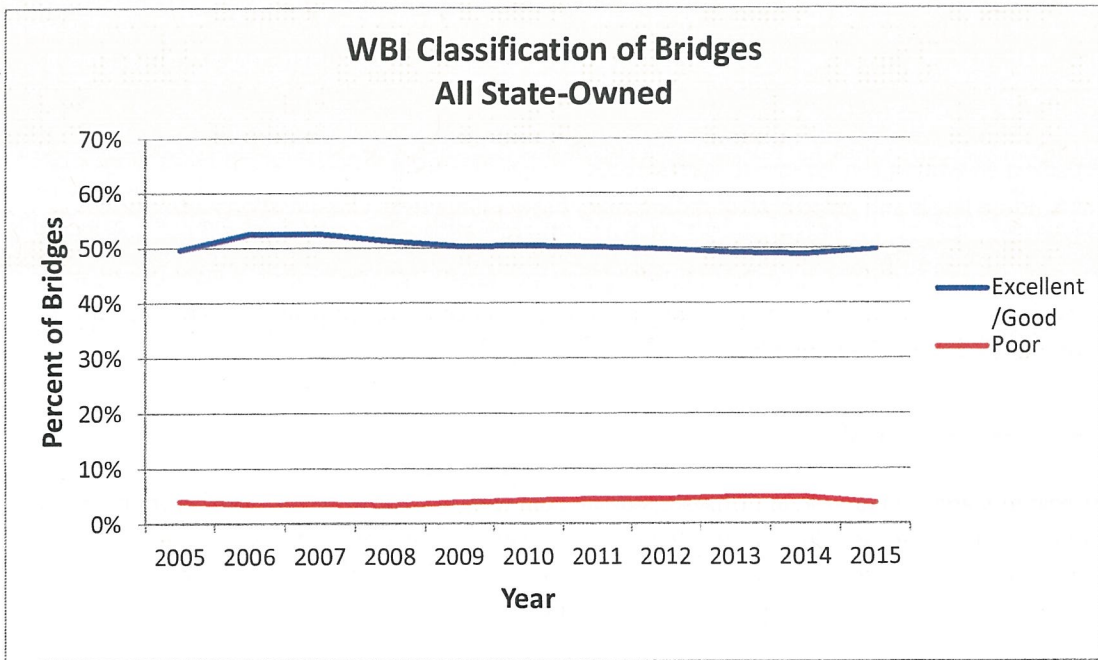
II. Bridge Management

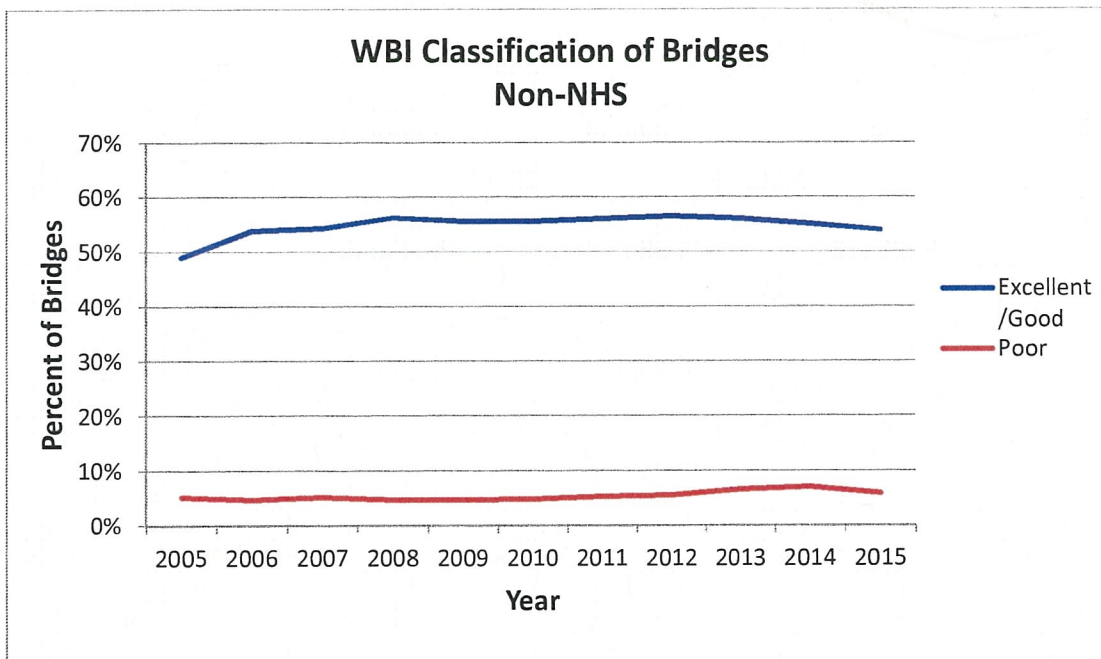
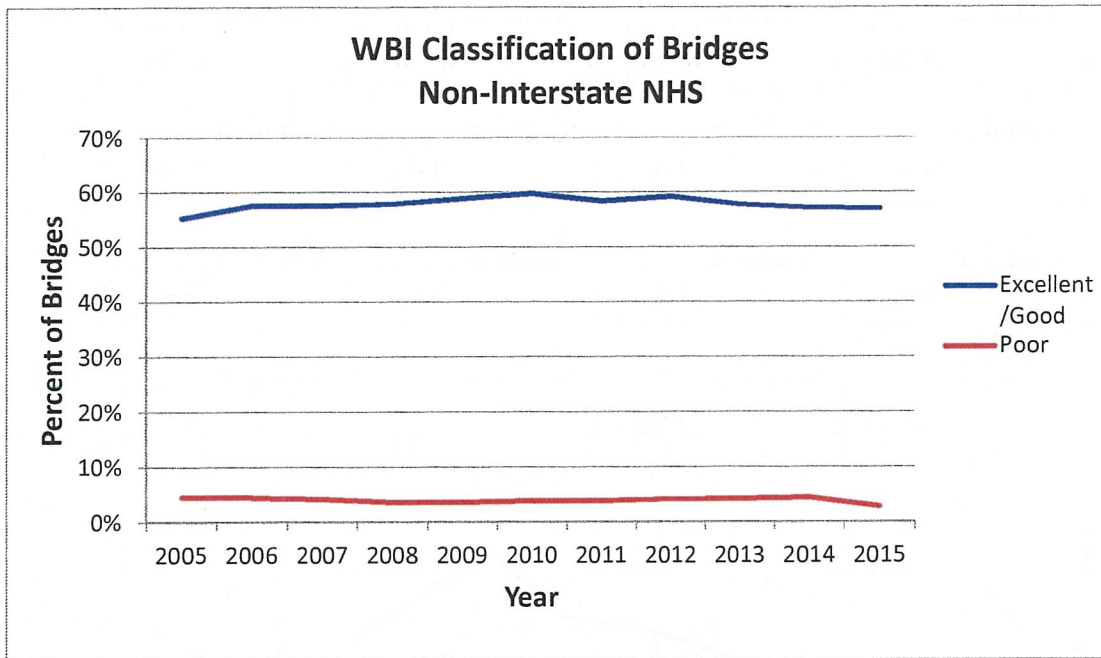
The WYDOT bridge management system utilizes historical data with current in-service conditions to quantify current and future needs. Data is collected on a two-year cycle in accordance with national standards and includes an assessment of the bridge, the roadway and the stream crossing. A variety of ratings are combined to determine the **Wyoming Bridge Index (WBI)**.

The WBI provides a high-level overview of the relative condition of the bridges, while individual components help distinguish differences in bridge attributes. This helps focus rehabilitation strategies. The index is comprised of a **structural condition** rating, **maintenance** rating, **functionality** rating, and **risk** rating. These ratings are assessments of a bridge's current structural adequacy, condition of commonly maintained components, the effect on users, and vulnerability to extreme events. Bridges are given an overall rating of **excellent**, **good**, **fair** or **poor** based on a composite score of the four component ratings. The percentage of state-owned bridges in these categories is summarized in the following figure.



The following figures quantify the historical trends for all, interstate, non-interstate NHS and non-NHS state-owned bridges rated as excellent/good and poor.

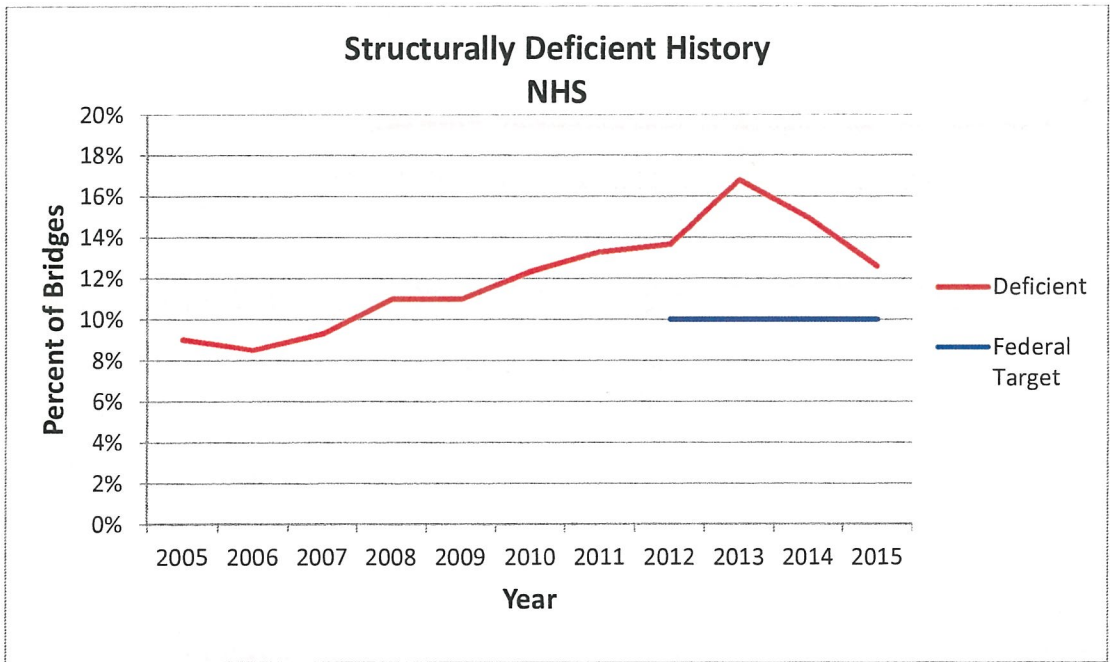


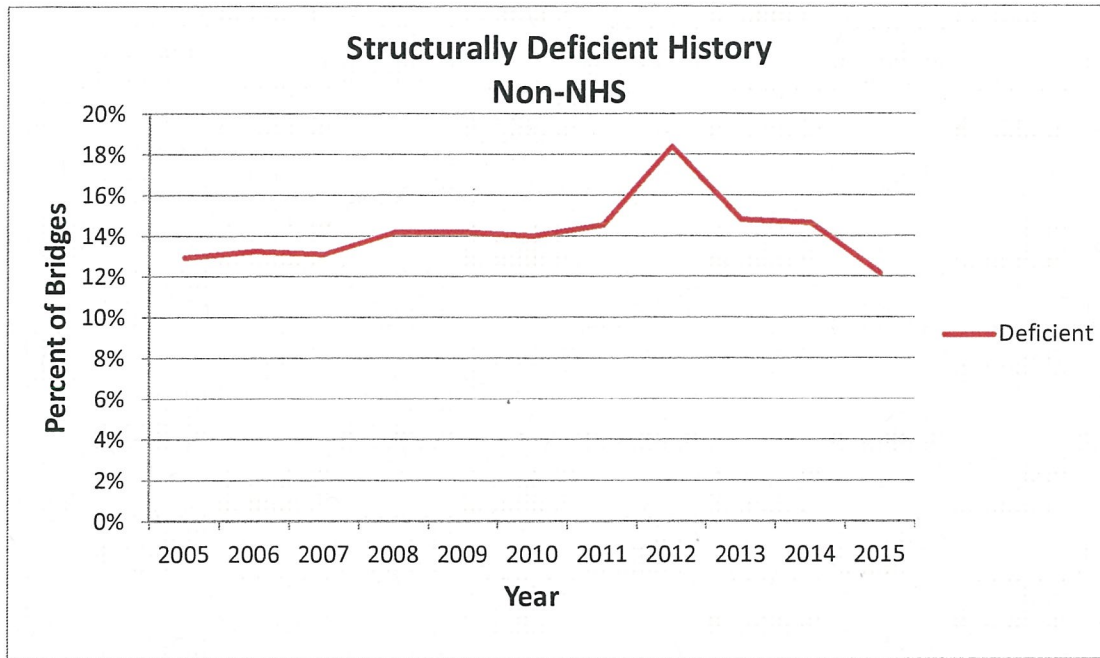


At this time, bridge condition and cost projection capabilities are limited, and the national bridge management software is currently being updated to assist in this effort. The requirements of the federal highway bill include new bridge inspection elements which are being incorporated into this software. The new elements will take time to get consistency in the data. As a result, changes in the data can be anticipated as refinements are made each year. The Federal Highway Administration is in the process of proposing performance measures for NHS bridges; these will be incorporated into our bridge management software as they become available.

A **structurally deficient bridge** is a federal designation based on an assessment of physical condition and load-carrying capacity of a bridge. If there are elements of the bridge that have experienced a level of deterioration that could reduce the structure's ability to carry the anticipated traffic loads, the bridge is classified as structurally deficient. Note: The fact that a bridge is structurally deficient does not imply that it is likely to collapse or that it is unsafe. Rather, maintenance and rehabilitation of various components are necessary to restore its condition.

The federal performance measure require no more than 10 percent of the NHS bridges, by deck area, are classified as structurally deficient. The following depicts the trends of the NHS bridges and Non-NHS bridges rated as structurally deficient.





Further, WYDOT’s goal is to maintain 60 percent of the state-owned bridges in good or excellent condition. However, WYDOT’s bridges are experiencing higher traffic volumes and heavier loads, which is reflected in the increased deterioration noted during routine bridge inspections. The average age of the state-owned bridges is 44 years and fewer bridge replacements are included in the highway improvement program.

Bridge Funding Shortfall

Based on this information, historic costs, and the trends shown above, an additional \$30 million per year is needed to address the state’s bridge needs in the near term.

III. Safety Management

The overall safety goal of WYDOT is to reduce the frequency and severity of crashes on the state’s roadways. That essentially translates to getting the most reduction in crashes possible from the dollars spent in the name of safety.

The WYDOT safety management system is a data driven strategic approach to improve highway safety. It uses a collection of tools, business processes, cross-program workflows and guidance on implementing highway safety to facilitate the identification and correction of safety concerns on the highways, and to achieve the overall safety goal.

The safety management system supports WYDOT business objectives by helping to:

- Optimize safety spending
- Maintain transparency
- Facilitate cross-program efforts

The safety management system has identified those roadways within the state that have a higher-than-average crash rating, and work is underway to develop proposed treatments for roadway segments that can be ranked in order of the largest benefit to the least cost ratio. Benefits are the elimination or reduction of future crashes; treatments are directed toward crash types that occur more frequently for a variety of reasons.

The safety management system gives WYDOT higher quality, more useful information on which to base decisions to correct or improve a hazardous road location or feature during the programming and design phases.

IV. Project Selection

The STIP represents those projects WYDOT expects to construct in the upcoming fiscal year and those projects being designed for construction in the following five fiscal years. Highway projects are selected based on the performance of the statewide highway system, including pavement and bridge conditions and asset management systems recommendations. Highway safety and mobility are evaluated. Public input is gathered on these projects, and the STIP is developed balancing the needs with the available annual funding necessary to achieve the needs of the system.

The Transportation Commission

The Transportation Commission reviews and makes the final decisions on the STIP. The STIP is revised quarterly, as needed, due to variables including construction costs, funding and unforeseen circumstances. Projects may be moved from one fiscal year to another, either moved back or forward, depending on the variables experienced. The Transportation Commission authorizes preliminary engineering or construction funding on new projects monthly.

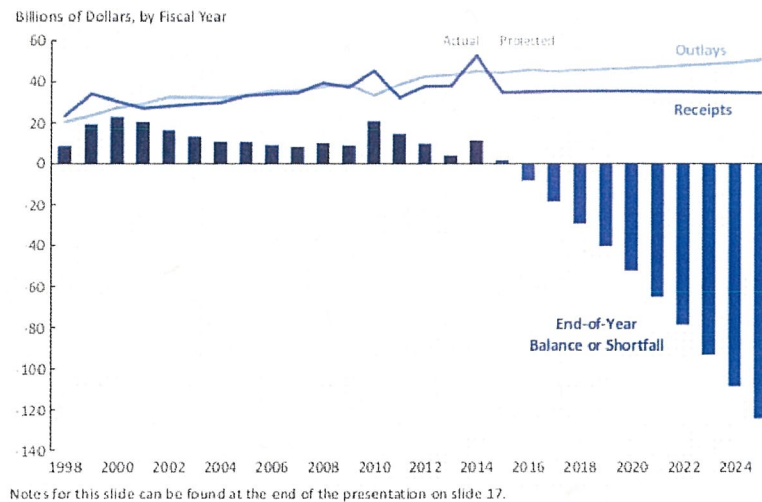
V. Overall Funding

Based on the 2016 Transportation Commission approved STIP, WYDOT anticipates awarding **\$282 million** in highway construction projects. Of this amount, roughly **73% are federal highway funds** and **27% are state funds**.

An additional \$62 million per year is needed to maintain the state's transportation system in its current condition. \$32 million dollars of this shortfall is needed for the state's highways and \$30 million is needed for bridges.

Beginning in fiscal year 2015, the Congressional Budget Office projects revenues credited to the highway account of the Highway Trust Fund will be insufficient to meet the fund's obligations resulting in steadily accumulating shortfalls. Under current law, the trust fund cannot incur negative balances, nor is it permitted to borrow to cover unmet obligations.

Receipts, Outlays, and Balance or Shortfall for the Highway Account Under CBO's March 2015 Baseline, 1998 to 2025



www.cbo.gov/publication/50130

Since the federal highway bill expired September 30, 2014 there have been five short term extensions. The latest interim measure will expire November 20th, and lawmakers continue to consider legislation to ensure a viable federal aid program that matches outlays to the anticipated receipts. In WYDOT's six-year state transportation improvement program, we have anticipated a consistent level of federal funding, equal to our 2014 obligation authority, but there is a possibility that this could be drastically reduced.

VI. Summary

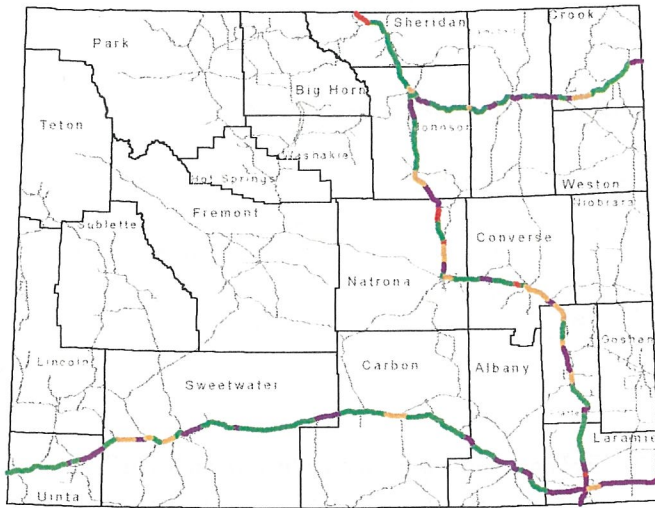
WYDOT will continue to optimize the use of federal and state funds in an effort to maintain the state highway system in its current condition. We use our asset management systems (pavement, bridge, and safety) to provide an objective evaluation into the current and future predicted conditions of the highway assets. These systems assist our engineering staff in prioritizing and programming the necessary construction activities.


Based on the forecasts of these models, an additional \$62 million of funding is needed to maintain the state's highways and bridges in their current condition, assuming no decrease in federal funds.

Note: The federal highway bill expired September 30, 2014. The future solvency of the Federal Highway Trust Fund is not yet known, and without additional revenue, WYDOT's federal funding could be drastically reduced.

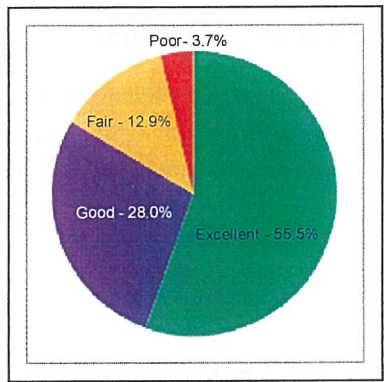
Interstate - Current Conditions

Miles based on State owned roads included in the Pavement Management System (PMS).



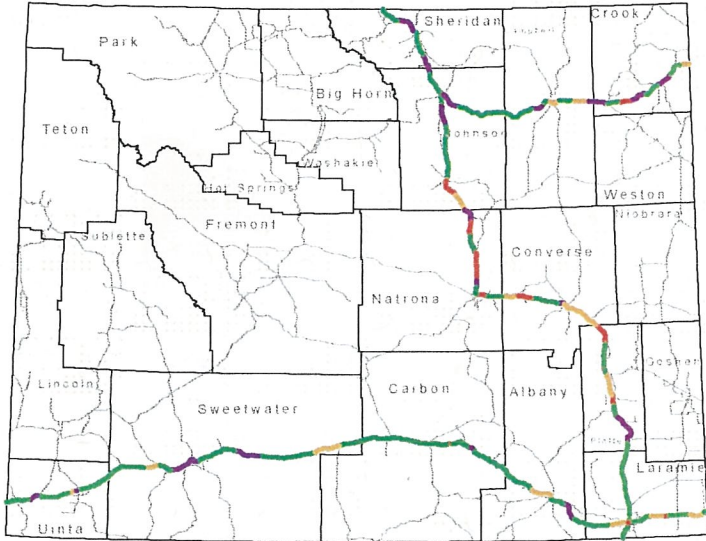
Excellent  Good  Fair  Poor 

Interstate - 2015



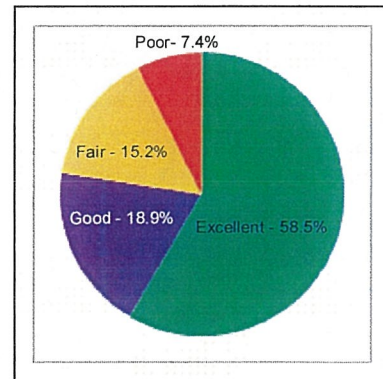
Interstate - 2020

Miles based on State owned roads included in the Pavement Management System (PMS).



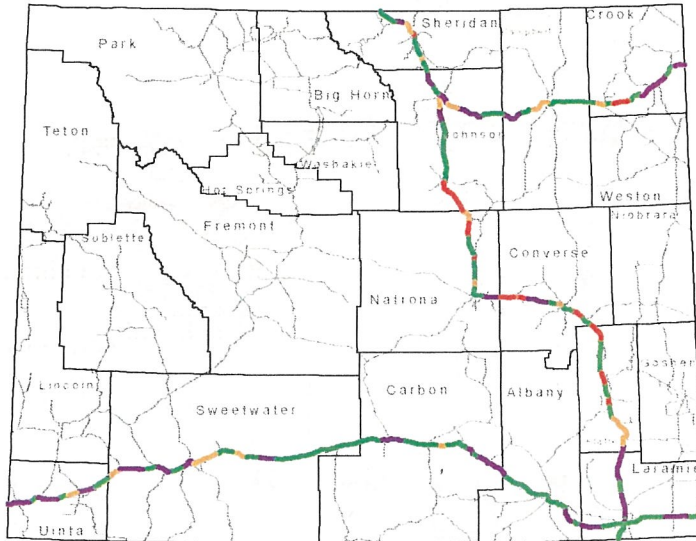
Excellent  Good  Fair  Poor 

Interstate - 2020

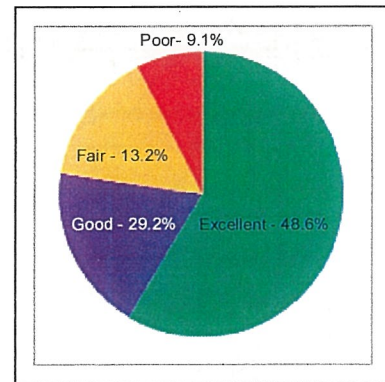


Interstate - 2025

Miles based on State owned roads included in the Pavement Management System (PMS).

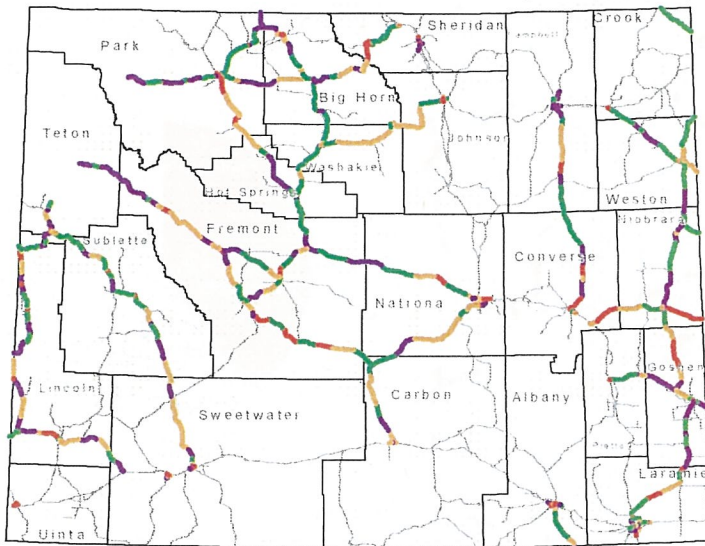


Interstate - 2025



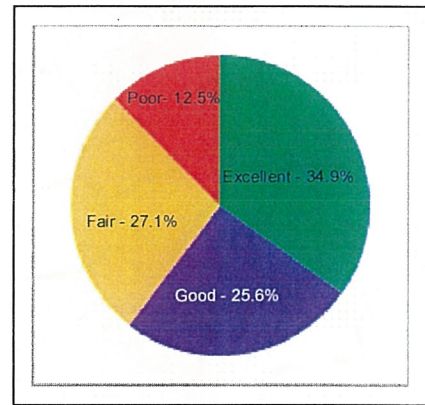
Non-Interstate NHS - Current Conditions

Miles based on State owned roads included in the Pavement Management System (PMS).

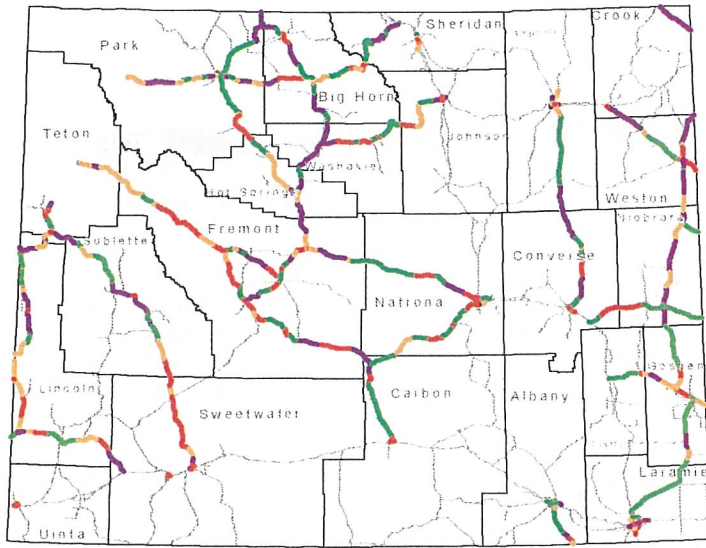


Excellent Good Fair Poor

Non-Interstate NHS - 2015

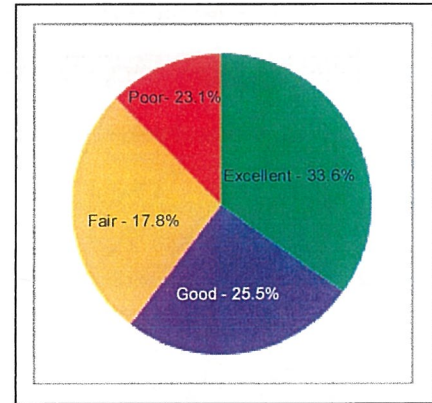


Non-Interstate NHS - 2020
Miles based on State owned roads included in the Pavement Management System (PMS).



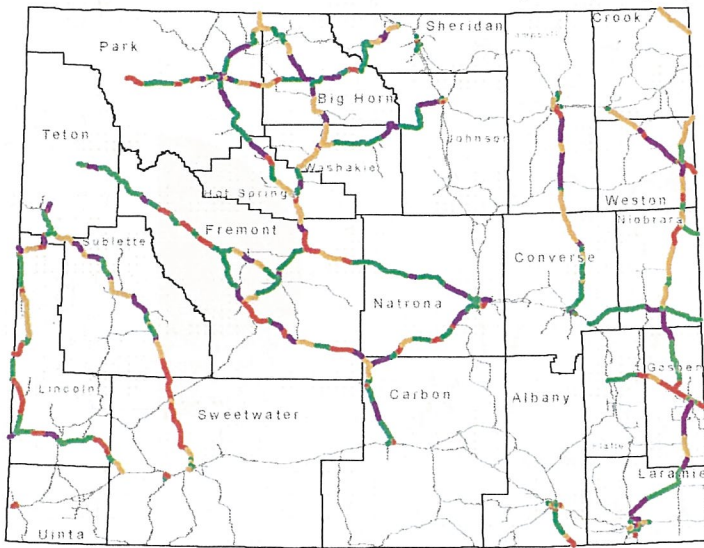
Excellent █ Good █ Fair █ Poor █

Non-Interstate NHS - 2020



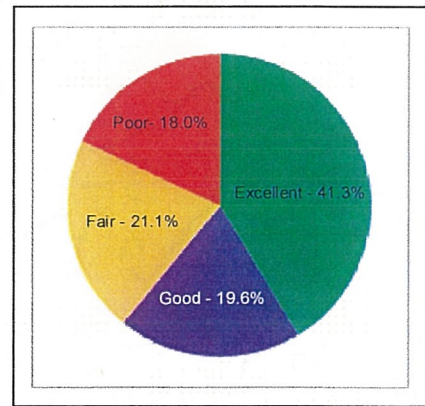
Non-Interstate NHS - 2025

Miles based on State owned roads included in the Pavement Management System (PMS).

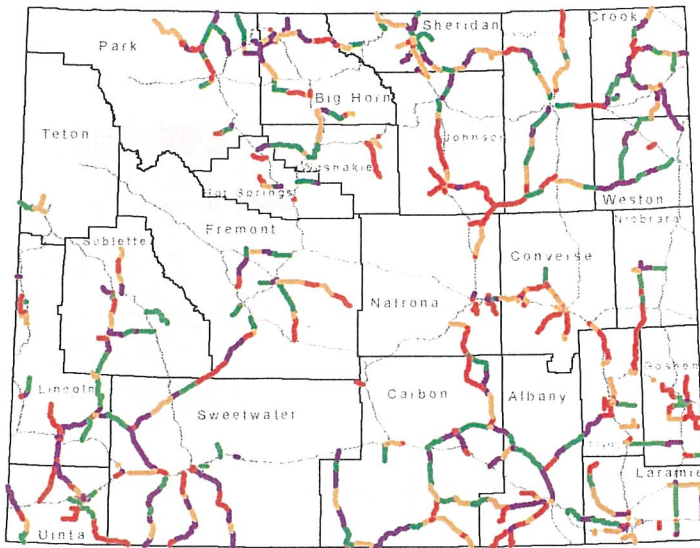


Excellent ■ Good ■ Fair ■ Poor ■

Non-Interstate NHS - 2025

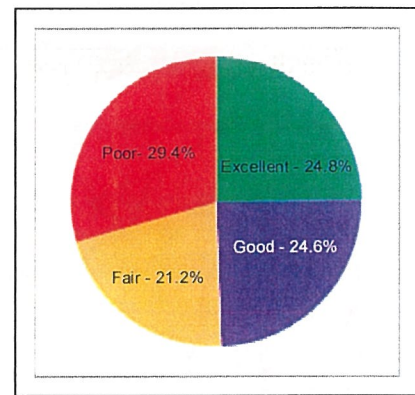


Non-NHS - Current Conditions
Miles based on State owned roads included in the Pavement Management System (PMS).



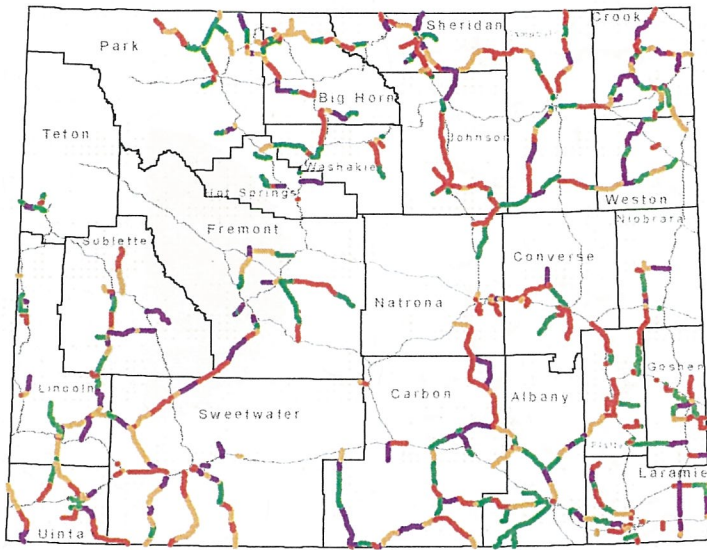
Excellent █ Good █ Fair █ Poor █

Non-NHS - 2015



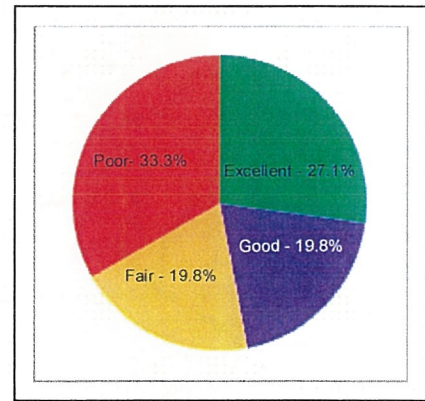
Non-NHS - 2020

Miles based on State owned roads included in the Pavement Management System (PMS).



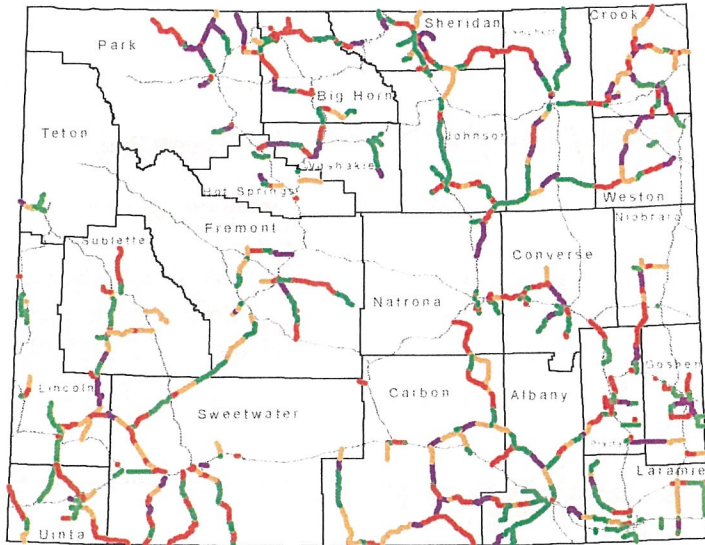
Excellent — Good — Fair — Poor —

Non-NHS - 2020



Non-NHS - 2025

Miles based on State owned roads included in the Pavement Management System (PMS).



Excellent  Good  Fair  Poor 

Non-NHS - 2025

