

Transportation/System Performance Management

According to the FAST Act, a long range transportation plan needs to include a system performance report and subsequent updates evaluating the condition and performance of the transportation system with respect to the Performance targets. The information should include progress achieved by the MPO in meeting the performance targets in comparison with system performance recorded in previous reports, including baseline data. The LRP will provide information on the current and proposed target information adopted by MPO for roads, bridges, and transit. Updates to target data will be posted on the SWMPC website.

The Federal Highway Administration (FHWA) defines Transportation Performance Management (TPM) as a strategic approach that uses system performance information to make investment and policy decisions to achieve national performance goals. In short, TPM is systematically applied to:

- Provide key information to help decision makers understand the consequences of investment decisions across transportation assets or modes;
- Improve communication between decision makers, stakeholders, and the traveling public; and ensures targets and measures are developed in cooperative partnerships and based on data and objective information.

Congress developed, through the Moving Ahead for Progress in the 21st Century (MAP-21) Act and the Fixing America's Surface Transportation (FAST) Act,

new rules for states and metropolitan planning organizations (MPOs) to collect data and establish performance targets, to be utilized in transportation planning and programming processes. Rather than setting its own targets, the NATS MPO has chosen to support the statewide safety, pavement, bridge, system performance, and freight targets set by MDOT, and the transit asset management targets set by the Niles Dial A Ride. The MPO supports those targets by agreeing to plan and program projects so that they contribute toward the accomplishment of the performance measures.

By agreeing to support the state's targets for safety, pavement, bridges, system performance, and freight, and transit asset management targets, the NATS MPO agrees to:

- Work with the Michigan DOT and stakeholders to address areas of concern regarding fatalities and serious injuries, pavement, bridges, system performance, and freight within the metropolitan planning area.
- Work with the Niles Dial A Ride and Buchanan Dial A Ride to address areas of concern regarding transit and transit asset management.
- Coordinate with the Michigan DOT, Niles Dial A Ride, and Buchanan Dial A Ride to include the State and transit performance measures and targets in the Long-Range Transportation Plan.
- Integrate into the metropolitan transportation planning process the goals, objectives, performance measures, and targets described in other Michigan DOT transportation plans and processes.

New federal performance measurement requirements focus on:

- ⇒ Safety
- ⇒ Pavement condition
- ⇒ Bridge condition
- ⇒ Travel time reliability & freight
- ⇒ Congestions mitigation & air quality
- ⇒ Public transportation

- Include a description in the Transportation Improvement Program (TIP) of the anticipated effects of the programming process towards achieving the State safety, pavement, bridges, system performance, freight, and transit asset management targets.

Roads and Highways Reporting Requirements

MDOT is required to report to FHWA on the establishment of state performance targets and the progress made in attaining the state targets on a biennial basis (October 1 of each even numbered year). An exception is for the safety performance measures, which are required to be reported by MDOT to FHWA through the Highway Safety Improvement Program Annual Report by August 31 of each year. MPOs are not required to provide annual reports other than MPO decisions on targets. MPOs are required to report MPO performance targets to MDOT in accordance with the documented procedures. This will result in MPOs reporting MPO safety targets annually to MDOT, and other performance targets as they are established (every two or four years).

Safety Performance

Total Fatalities & Fatalities Rate

How Targets Are Set: MDOT and Office of Highway Safety planning used two different models to forecast the total fatalities for target setting. The fatality models developed by MDOT relied on the relationship between oil prices, the Dow Jones Industrial futures and fatalities. The price of oil and the level and changes in the Dow Jones Industrial futures are closely correlated to the travel demand and traffic crashes. The second model, developed by the University of Michigan Transportation Research Institute (UMTRI), relies on results of a recently completed research report titled *Identification of Factors Contributing to the Decline of Traffic Fatalities in the United States*. This model is based on the correlation between crashes and vehicle miles traveled (VMT), Gross Domestic Product (GDP) per capita, median income, and the unemployment rate among 16-24 year olds. The final forecasted value for fatalities is the average of MDOT and UMTRI forecasted values.

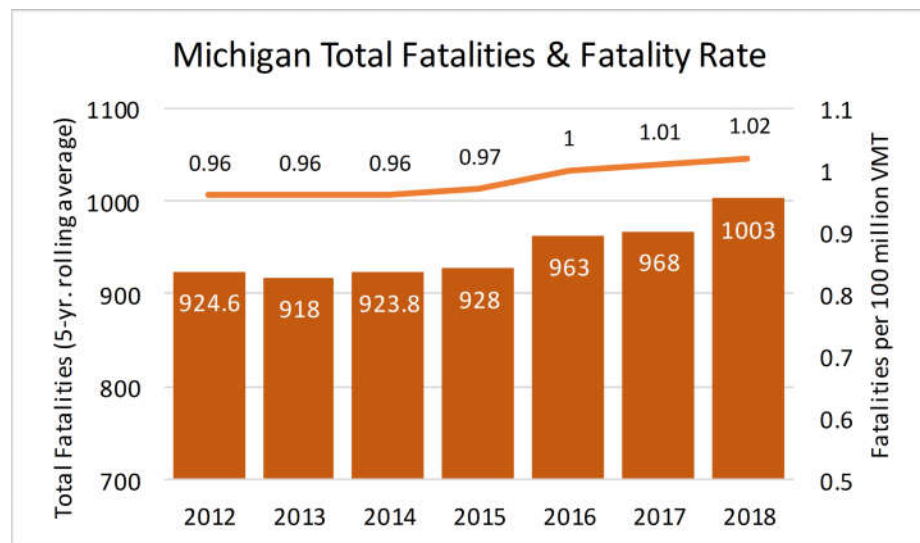


Chart Interpretation: The statewide number of fatalities rose significantly in 2016 and 2017. While part of the rise reflects an increase in the overall amount of travel in the state, the fatality rate shows elevated risk for every mile traveled in 2016 and 2017.

Total Serious Injuries & Serious Injuries Rate

How Targets Are Set: The UMTRI model was the sole model used in forecasting total serious injuries as it exhibited a strong linear relationship of the ratio of serious injuries and fatalities (A/K). The forecasting total for serious injuries is **5,243 in 2017 and 5,031 in 2018**. The target for calendar year 2018 is **5,136** for serious injuries and **5.23** for serious injury rate.

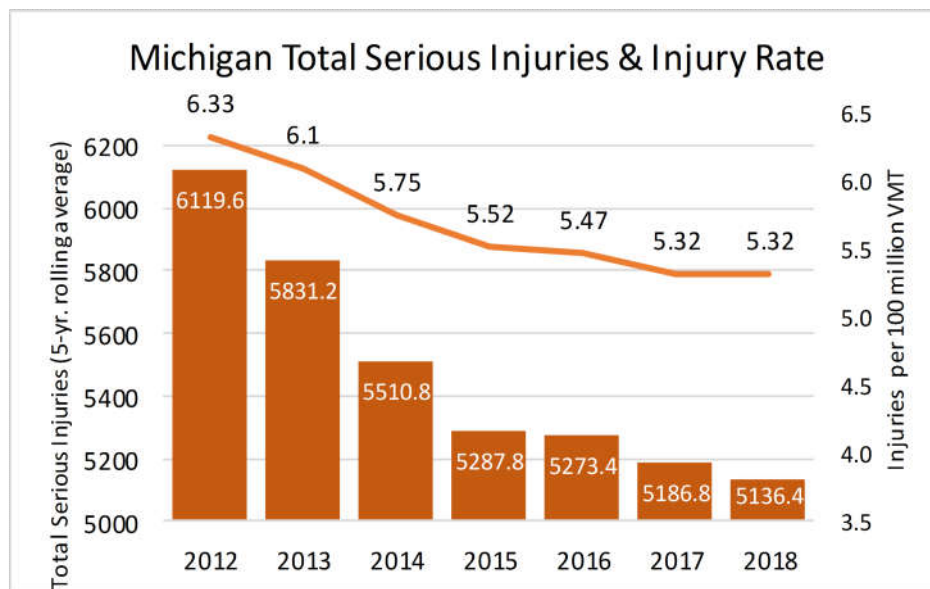


Chart Interpretation: The statewide number of serious injuries has seen a decrease since 2012. While there has been an increase in the overall amount of travel in the state, the serious injury rate is trending down for risk for 2017 (5.32) and 2018 (5.23).



State Actions

- To meet the safety goal of reducing fatalities and serious injuries on the state trunkline system, the strategy of the Safety Program is to select cost-effective safety improvements, as identified in Michigan's SHSP, to address trunkline locations with correctable fatality and serious injury crashes.
- All proposed safety funded improvements must be supported by the MDOT Region's Toward Zero Deaths Implementation Plan to mitigate crashes within the region. Priority is given to those projects, within each region, with SHSP focus area improvements that have the lowest cost/benefit analysis or are a proven low-cost safety improvement to address the correctable crash pattern.
- On the local road system, MDOT administers federal safety funds for safety improvements supported by a Local Road Safety Plan or addressed by means of a low-cost safety project. High Risk Rural Road is one program used to address rural roadways where fatalities and serious injuries exceed the statewide average for that class of roadway.

MPO Actions

- As shown in the table below, NATS supported the adoption of MDOT's State Targets for Safety Performance Measures for Calendar Year 2019. This established targets for five performance measures based on five year rolling averages, including:
 - ◊ Number of Serious Injuries
 - ◊ Rate of Serious Injuries per 100 million VMT
 - ◊ Number of Serious Injuries
 - ◊ Rate of Serious injuries per 100 million VMT

Michigan State Safety Targets for Calendar Year 2019

Safety Performance Measure	Baseline Through Calendar Year 2018	Calendar Year 2020 State Safety Target
Fatalities	987.4	999.4
Fatality Rate	0.99	0.97
Serious Injuries	5,415.6	5,520.4
Serious Injury Rate	5.41	5.34
	742.4	735.8

- Give points in TIP project section to projects that address safety
- Encourage Act 51 Agencies to implement systemic treatments, such as cable stay barriers and center rumble strips to reduce lane departure crashes
- Use data to develop projects that address safety hazards in particular locations
- Promote safe travel habits for drivers, cyclists, and pedestrians through education and



Total Bicycle & Pedestrian Fatality & Serious Injuries

How Targets Were Set: Results from the UMTRI model (the A/K relationship) were also used to generate forecasted 5 year moving average values for bicycle and pedestrian fatalities and serious injuries for 2017 and 2018. The forecasting total for fatalities and serious injuries is **782 in 2017 and 752 in 2018**. The target for calendar year 2019 is **759.8** for fatalities and serious injuries.

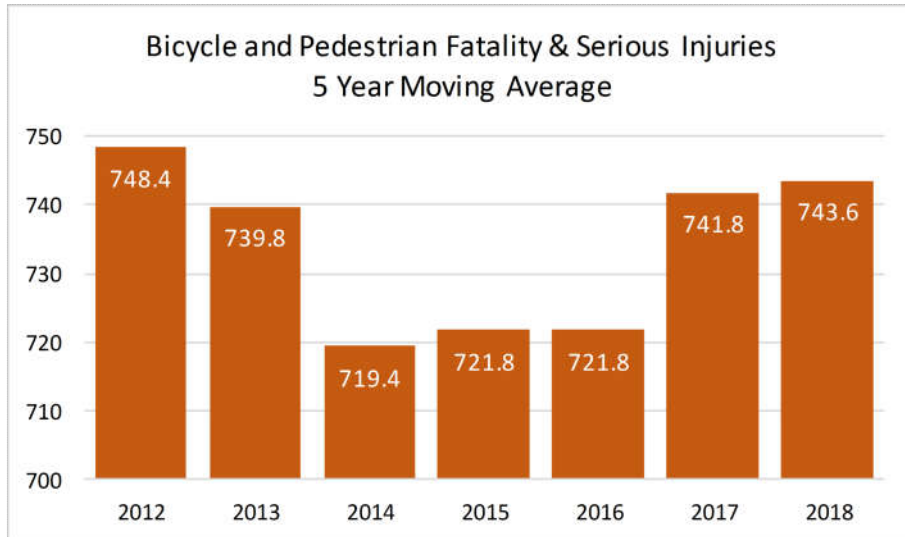


Chart Interpretation: Fatalities and Serious Injuries have seen a general downward trend since 2012 and saw lower numbers from 2014-2016. The increase in fatality and serious injury rate may be due to an overall increase in vehicular traffic (due to a good economy and inexpensive gas prices) as well as an increase in distracted driving. These factors don't appear to be changing in the near future, likely keeping the trends high.



State Actions

- Implement the recommendations of the MDOT Southwest Region Non-Motorized Plan.
- MDOT continues to work with researchers to improve pedestrian and bicycle safety. Examples of current or past work include the development of gateway treatments for pedestrians and Michigan bicycle and pedestrian travel models.
- MDOT supports Western Michigan University’s participation in the Roadway Safety Institute as part of the Region 5 University Transportation Center aimed at high risk road users
- MDOT also participates with UMTRI in the development of a risk model for non-motorized users, and with Wayne State University in research to further side-path safety.

MPO Actions

- As shown in the table below NATS supported the adoption of MDOT’s State Targets for pedestrian & bicycle Safety Performance Measures for Calendar Year 2019. This established targets for performance measures based on five year rolling averages of the:
 - ◊ Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries

Michigan State Safety Targets for Calendar Year 2019

Safety Performance Measure	Baseline Through Calendar Year 2017	Calendar Year 2019 State Safety Target
Non-motorized Fatalities & Serious Injuries	741.8	759.8

- Consider non-motorized elements during project design.
- Work with the Communities to advocate for the issues and needs of non-motorized users.
- Utilize MDOT road safety audits and engineering countermeasures, and other initiatives, programs or designs that are promoted as part of the Toward Zero Deaths National Strategy.



Transit State of Good Repair

On July 26, 2016, the Federal Transit Administration published the final rule on Transit Asset Management (TAM) (49CFR Part 625). Under the final TAM rule, State DOTs, MPOs, and designated transit providers must collect and report data for four performance measures covering rolling stock, equipment, infrastructure, and facility

condition.

The NATS MPO area contains no relevant infrastructure as defined under 49 CFR part 625 (e.g. fixed guideway for light rail mass transit), and therefore the MPO is only required to set targets for equipment, rolling stock, and facilities. Targets are based on Niles Dial A Ride, which is the federally recognized public transit service provider for the Michigan portion of the South Bend urbanized area, and therefore must adopt targets for the performance of their transit assets annually for the ensuring year. MPOs must establish TAM targets specific to the MPO planning area. The MPO then updates its TAM targets every four years.

How Targets are Set

SWMPCC in partnership with the Niles Dial A Ride ran reports from the Public Transportation Management System (PTMS, the reporting system for public transit agencies who receive federal funding. Targets were based upon funds available to Niles Dial A Ride and the current condition of revenue vehicles, service vehicles, and facilities. Targets are set on an annual basis each year in January and reported by Niles Dial A Ride to the National Transit Data Base (NTD).

NATS targets were set for 2020 and the four year period will coincide with the four years' of the Transportation Improvement program (TIP). NATS has adopted the following TAM targets:

Category	Performance Measure	Assets	2019 Condition	2020 Target
Revenue Vehicles	Age – Percent of revenue vehicles within a particular asset class that have met or exceeded their useful life benchmark (ULB)	CU – Cutaway Buses –6	43 % exceeds ULB	29 % Exceeds ULB
Non-revenue Vehicles	Age – Percent of non-revenue vehicles that have met or exceeded their useful life benchmark (ULB)	Truck with snow plow	100% Exceeds ULB	100% Exceeds ULB
Facilities	Condition – percent of facilities with a condition rating below 3.0 on the FTA TERM Scale	Administration /Maintenance Building	1% rated 3.0 on FTA TERM scale.	0 % rated below a 3.0 on FTA TERM Scale

Pavement Performance

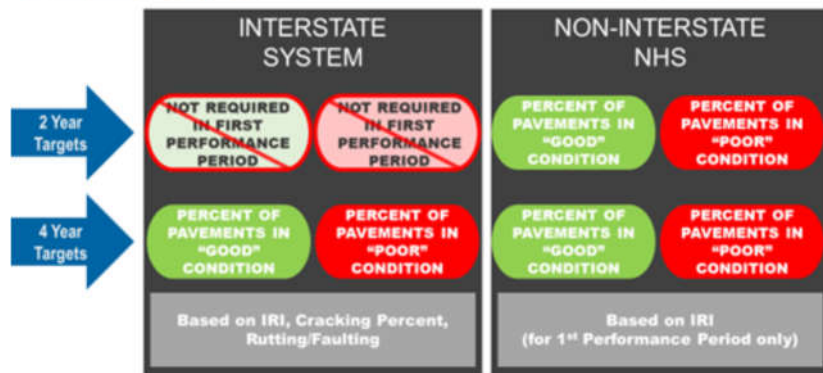
The Federal Highway Administration (FHWA) published in the Federal Register (82 FR 5886) a final rule establishing performance measures for State Departments of Transportations (DOTs) to use in managing pavement and bridge performance on the National Highway System (NHS). The National Performance Management Measures; Assessing Pavement Condition and Bridge Condition for the National Highway Performance Program Final Rule addresses requirements established by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and reflects passage of the Fixing America’s Surface Transportation (FAST) Act. The rule became effective May 20, 2017.

The federal rule requires MDOT to establish targets for pavement condition measures Percent Good and Percent Poor on the Interstate and non-Interstate NHS. Targets are required for two and four-year intervals for each measure, with eight targets in total. For the Interstate measures, there will be no two-year targets for the first (2018-2021) performance period per 23 CFR Part 490, therefore, there will only be six targets in the first period.

condition. If two or more metrics are “poor,” it is to be considered in poor condition. Only IRI will be used to determine non-interstate condition for the 2018-2024 performance period, after which it will use PCM. Cracking Percent and IRI are to be reported on all pavement types. Rutting is to be reported only on asphalt pavements, and faulting, on jointed concrete pavements. The table below indicates the metric thresholds for condition on each pavement type, as defined by the rule.

Pavement Condition Thresholds		Metric Value Range		
Metric	Surface Type	Good	Fair	Poor
International Roughness Index [IRI] (inches/mile)	Asphalt Pavement, Jointed Concrete Pavement, CRCP ¹	<95	95 - 170	>170
	Asphalt Pavement	<5%	5 - 20%	>20%
Cracking Percent (% of total area)	Jointed Concrete Pavement	<5%	5 - 15%	>15%
	CRCP ¹	<5%	5 - 10%	>10%
Rutting (inches)	Asphalt Pavement	<0.20	0.20 - 0.40	>0.40
Faulting (inches)	Jointed Concrete Pavement	<0.10	0.10 - 0.15	>0.15

REQUIREMENTS



The rule requires states to measure, monitor and set targets based upon a composite index of pavement condition measures (PCM). The four metrics to be used are International Roughness Index (IRI), Cracking Percent, Rutting, and Faulting as reported by states to the FHWA’s Highway Performance Monitoring System (HPMS). All four metrics will be used to determine the condition for Interstate. If all three metrics on a segment are “good,” then a pavement is rated in good

Performance Measures: There are four performance measures for assessing pavement condition based on composite analysis of the metrics above:

- 1) Percent of Interstate pavement in Good Condition
- 2) Percent of Interstate pavement in Poor Condition
- 3) Percent of Non-Interstate NHS pavement in Good Condition
- 4) Percent of Non-Interstate NHS pavement in Poor Condition.

How Targets Were Set

The TPM Pavement Team reviewed historical trends of condition metric data from the last decade (2007-2017) to support future target establishment. FHWA and MDOT use the Highway Performance Monitoring System (HPMS) to report pavement condition. According to the rule, HPMS data must be submitted annually by April 15 for Interstate data, and June 15 for Non-Interstate NHS data. These figures were used as a baseline to establish the statewide targets. With MDOT’s current funding levels, trunkline pavement condition is anticipated to decline over the course of the next decade, and therefore, MDOT has chosen conservative targets to reflect this decline. Given the definition of significant progress (equal to or better than the target, or better than the baseline condition), MDOT can achieve significant progress while targets are declining if condition does not fall below the targets.

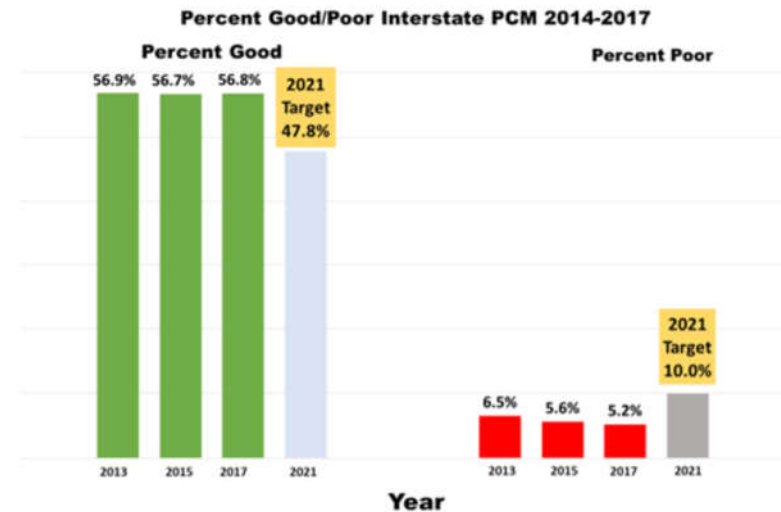
Conservative Targets

The conservative nature of the approved targets is based on several factors:

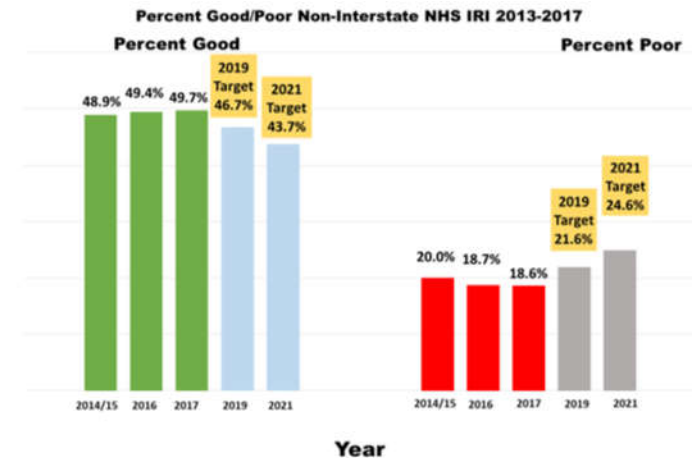
- 1) Forecasts of the trunkline pavement condition based on Remaining Service Life (RSL) is declining.
- 2) Sample size for the cracking measure will move from 30% to 100% of roads sampled.
- 3) Issues surrounding the data such as the use of new vendors and the introduction of more advanced data collection may make data collection inconsistent.
- 4) A buildup in the Interstate IRI category at the edge of good gives the potential for a significant number of segments to fall into fair.
- 5) The use of a composite score means that all three measures must be good to be counted as good. If only one measure was to fall the whole segment is no longer considered good.
- 6) At the current time the sample size available for previous years is relatively small for the use of trend analysis.

Other major potential hindrances include climate changes, funding uncertainties, and funding levels.

Interstate Targets



Non-Interstate Targets



State Actions:

Department goals for state trunkline pavement condition are established by the State Transportation Commission (STC) and influence the way MDOT invests in and maintains state-owned transportation infrastructure. To do this, MDOT conducts investment planning. Investment strategies guide the allocation of capital resources to achieve the goals established.

Investments are focused where they will most benefit the public, consistent with the direction established.

- Investment strategies are developed utilizing anticipated available funding, life cycle planning, and performance gap analysis, and the results of risk analysis.
- The various strategies are also analyzed and compared to determine how they would impact the overall goals and objectives set by the STC.
- The desired mix of fixes, investment levels, and funding targets are developed for the selected investment strategy and provided in the Highway Call for Projects memo. They form the basis for project selection and prioritization.
- The selected investment strategy is communicated to the public by way of the annual Five-Year Transportation Program. MDOT's investment strategy to achieve the constrained Michigan targets for asset condition are reflected in the STIP program of projects.

MPO Actions

- Encourage all agencies to adopt a road asset management plan
- Use a scoring system to help guide the programming of federal funds in a way that achieves maximum benefit to the region

Reporting Requirements:

Baseline Performance Report: In this report, MDOT must establish 2-year and 4-year targets, describe baseline conditions, urbanized area boundaries and population data, NHS limits, and relationships with other performance

expectations. The Baseline Performance Report will include HPMS data collected in 2016 and 2017. States will be able to adjust the 4-year targets in the Mid Performance Progress Report based on data collected in 2018 and 2019. To allow for the phasing in of new reporting requirements for Interstate pavement conditions, states are only required to establish 4-year targets for Interstate pavements in the Baseline Performance Report that is due October 1, 2018. Both 2-year and 4-year targets are required for non-Interstate NHS pavements. **Baseline Performance Report due 10/1/18.**

Mid Performance Progress Report: MDOT must report on 2-year conditions and performance, investment strategy effectiveness and discuss progress in achieving targets. States have the option to adjust 4-year targets at this time. In this report states may include a discussion of target achievement and extenuating circumstances. Because states are not required to establish 2-year targets for Interstate pavements in the Baseline Performance Report, they would use the Mid Performance Progress Report to update baseline condition/performance data and, if necessary, adjust the 4-year targets. **Mid-Performance Period Progress Report due 10/1/20.**

Full Performance Progress Report: This report includes the same content as the Mid Performance Period Progress Report but reports on the 4-year targets. If a state has not made significant progress for achieving the NHPP targets in two consecutive biennial determinations, then the state DOT will include a description of the actions they will undertake to better achieve the NHPP targets in the next performance period. Even though significant progress is assessed for all four pavement performance measures, pavement condition penalties only apply for Interstate pavements. As part of the Full Performance Progress Report, MPOs will report targets and progress toward the achievement of targets. MPOs will report their established targets, performance, progress, and achievement of the targets to their respective state DOT in a manner that is agreed upon by both parties and documented in the Metropolitan Planning Agreement. **Full Performance Period Progress Report due 10/1/20.**

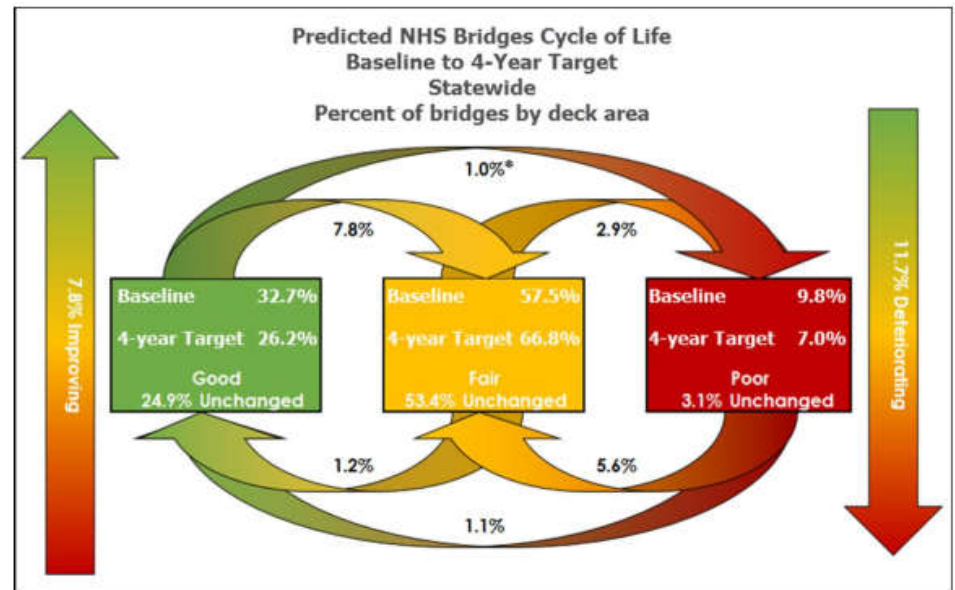
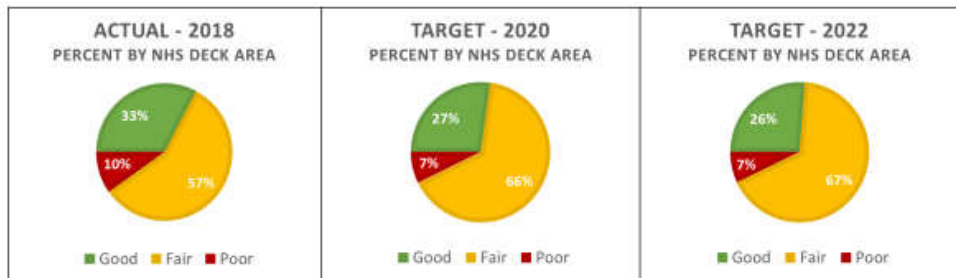
Bridge Condition

Federal law, outlined in the National Bridge Inspection Standards (NBIS), defines a bridge as a structure carrying traffic with a span greater than 20 feet and requires that all bridges be inspected every two years to monitor and report condition ratings. The FHWA requires that for each applicable bridge, the performance measures for determining condition be based on the minimum values for substructure, superstructure, deck, and culverts. The FHWA further requires counting this condition by the respective deck area of each bridge and express condition totals as a percentage of the total deck area of bridges in a state.

Condition ratings are based on a 0-9 scale and assigned for each culvert, or the deck, superstructure and substructure of each bridge. These ratings are recorded in the National Bridge Inventory (NBI) database. Condition ratings are an important tool for transportation asset management, as they are used to identify preventative maintenance needs, and to determine rehabilitation and replacement projects that require funding

How Targets Were Set

Starting from the condition reported with the NBI submittal on March 14th of 2018, the expected improved condition from projects and reduced condition from deterioration was summarized into expected condition in 2020 and in 2022. The deck areas in good, fair and poor conditions at each year was summarized. To account for uncertainty, the amount of deck area in good condition was conservatively reduced by 1%, and the amount of deck area in poor condition was increased by 1%. A 1% reduction for uncertainties reflects about 30 average size structures that either deteriorated faster than predicted or that did not see as much of an improvement as predicted.



How Targets Set

Starting from the condition reported with the NBI submittal on March 14th of 2018, the expected improved condition from projects and reduced condition from deterioration was summarized into expected condition in 2020 and in 2022. The deck areas in good, fair and poor conditions at each year was summarized. To account for uncertainty, the amount of deck area in good condition was conservatively reduced by 1%, and the amount of deck area in poor condition was increased by 1%. A 1% reduction for uncertainties reflects about 30 average size structures that either deteriorated faster than predicted or that did not see as much of an improvement as predicted.

Reporting Requirements

The Transportation Performance Management (TPM) Bridge Condition Rule designates recurring four-year performance periods for which MDOT is required to two year (midpoint) and four-year (full performance) targets for bridge condition on the National Highway System (NHS). MDOT is required to submit three performance reports to FHWA within the 4-year performance period.

- Baseline Performance Report
-October 1st, 2018
- Mid-Performance Period Progress Report
-October 1st, 2020
- Full Performance Period Progress Report
-October 1st, 2022

The two performance measures for assessing bridge condition are:

- Percent of NHS bridges in Good Condition; and
- Percent of NHS bridges in Poor Condition.

MDOT established bridge targets on May 20, 2018

MDOT Actions:

As the product of ongoing asset management by MDOT and our local agencies, projects are programmed each year to extend life or improve condition throughout the bridge network. MDOT analyzes the candidates for each of the major work types – preventive maintenance, rehabilitation and replacement – and identifies a strategy that is the most cost-effective means to achieve and sustain a state of good repair within financial constraints.

Starting from this initial strategy, the regions then perform more detailed analysis and scopes, coordinating with other programs such as road, and selecting projects through the annual Call for Projects process.

A small number of MDOT bridges are managed centrally within the Big Bridge Program. The Big Bridge Population is a unique subset of MDOT's trunkline bridge population that includes twenty-three large deck bridges (deck area in excess of 100,000 sq ft), thirteen complex bridges, and twelve moveable bridges. These forty-eight bridges are unique not only from an engineering standpoint, but they also represent large capital investments in terms of their initial construction costs and in terms of their long-term preservation and rehabilitation costs. Because of the significant investment these bridges represent, MDOT's goal is to preserve and maintain the Big Bridge inventory in a continuously good or fair condition state. This population is also of unique importance to the Performance Management Target Settings as the 37 structures that carry NHS comprise 14% of the trunkline NHS deck area.