DEPARTMENT OF TRANSPORTATION

2019 PAVEMENT CONDITION ANNUAL REPORT

March 2020

Office of Materials and Road Research

Table of Contents

List of Tables

List of Figures

INTRODUCTION

This report is prepared annually by the Minnesota Department of Transportation (MnDOT) Pavement Management Unit to provide information concerning trunk highway pavement performance. It discusses statewide performance trends compared with established targets and compares performance between the eight Area Transportation Partnerships (ATP).

BACKGROUND

MnDOT's trunk highway system consists of approximately 12,000 centerline miles (14,300 roadway miles) of pavement. This system consists of bituminous, concrete, and composite pavement with a wide range of conditions, ages, and performance. Each year, the Pavement Management Unit collects pavement roughness and digital image data on the entire trunk highway system, in both directions, and calculates several different metrics related to pavement performance. Condition data has been collected on the trunk highway network since the late 1960s.

DATA COLLECTION

The pavement roughness and surface distress data are collected using a sophisticated digital inspection vehicle (shown below). The van is driven in the outer lane of all trunk highways annually, in both directions. This van is equipped with two digital cameras, one facing straight ahead and one angling toward the right to collect right-of-way images. For pavement distress and rutting measurements, a 3D laser/camera system is used to produce images of the pavement surface, from which the type, severity, and amount of cracking can be determined. The van is also equipped with laser height sensors that measure the longitudinal pavement profile, from which pavement roughness is calculated. Pavement condition data is used to monitor the performance of the system, to aid in project selection, and to identify future pavement maintenance or rehabilitation needs.

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INDICES AND MEASURES

MnDOT's pavement condition data is reduced to several indices for reporting the statewide pavement performance measures in MnDOT's 20-year Transportation Plan: Ride Quality Index (RQI), Surface Rating (SR), Pavement Quality Index (PQI), and Remaining Service Life (RSL). Each index captures a different aspect of the pavement's health and can be used to rank pavement sections and predict the need for future maintenance and rehabilitation. They are each briefly described below.

RQI: Ride Quality Index

The RQI is MnDOT's ride, or smoothness, index. It uses a zero to five rating scale, rounded to the nearest tenth. The higher the RQI, the smoother the road is. The RQI is intended to represent the rating that a typical road user would give to the pavement's smoothness as felt while driving his/her vehicle. Most new construction projects have an initial RQI above 4.0. Pavements are normally designed for a terminal RQI value of 2.5. When a road has reached its terminal RQI value it does not mean the road cannot be driven on, but rather that it has deteriorated to the point where most people feel it is uncomfortable and a major rehabilitation is likely needed.

The RQI is calculated from the pavement's longitudinal profile, measured by the front mounted lasers on the digital inspection vehicle. A mathematical simulation, called the International Roughness Index (IRI), is then run to estimate the amount of vertical movement a standard vehicle would experience if driven down the road. The IRI is the roughness index used by every state DOT in the U.S. as well as most countries in the world. In the past, MnDOT has taken a rating panel of 30 to 40 people into the field and driven them over hundreds of test sections to get their perception of the smoothness of various pavement sections. Following right behind them was the digital inspection vehicle. This provides us with a direct correlation between the IRI, as measured by the van, and the perceived roughness, as felt by the rating panel.

SR: Surface Rating

Pavement distresses are those defects visible on the pavement surface. They are symptoms, indicating some problem or phenomenon of pavement deterioration such as cracks, patches, and ruts. The type and severity of distress a pavement has can provide great insight into what the future maintenance and/or rehabilitation needs will be.

MnDOT uses the SR to quantify pavement distress. The distress identification procedure used to determine the SR is done using computer workstations in the Pavement Management Unit of the Office of Materials and Road Research, located in Maplewood, MN. Specialized software is used to examine and analyze the digital images of the pavement captured by the van. The van captures several images simultaneously: front, side, and down.

Since 2017, condition surveys have been done using the AutoCrack system. The AutoCrack software looks at 3D images of the pavement surface and determines if any cracks or other distresses exist. If so, it then determines the location within the lane and also classifies distress by type and severity, and calculates length and/or width. A second system, called AutoClass, is then used to convert the AutoCrack distress types and severities into MnDOT distress types and severities. Because the system is automated, continuous distress surveys covering

100% of the length of each section are done. On undivided roadways, only the outside lane in the increasing direction (north or east) is rated when the SR is measured. On divided routes, the outside lane in both directions is rated.

The percentage of each distress in the section is determined and multiplied by a weighting factor to get a weighted distress value. The weighting factors are greater for higher severity levels of the same distress and greater for distress types that indicate more serious problems exist in the roadway such as alligator cracking or broken panels. The weighted distresses are then combined to determine the SR. The SR ranges from 0.0 to 4.0, and is reported to the nearest tenth. A higher SR means better condition. A road with no defects is rated at 4.0. A road in need of major rehabilitation or reconstruction will generally have an SR near or below 2.5.

PQI: Pavement Quality Index

The PQI is a composite index, equal to the square root of the product of RQI and SR. As such, it gives an overall indication of the condition of the pavement, taking into account both the pavement smoothness and cracking. The PQI is the index used to determine if the state highway system is meeting performance thresholds established for the Government Accounting Standards Board, Standard 34 (GASB 34).

RSL: Remaining Service Life

The RSL is an estimate, in years, until the RQI will reach a value of 2.5, which is generally considered the end of a pavement's design life. Most pavements will need some type of major rehabilitation when the RQI has reached this value. The RSL is determined from pavement deterioration curves. A regression curve is fit through the historical RQI data for each pavement section and the year the RQI will reach 2.5 is estimated. If there is insufficient historical data to make this calculation, default models, based on statewide pavement performance, are used. Rehabilitation activities with long service lives will add a considerable number of years to the RSL of a pavement. Short-term fixes, such as patching, may increase the pavement smoothness for a short time, but do not result in many additional years of RSL.

Each year, the RSL is calculated for all highway segments. From these values, a length-weighted Average Remaining Service Life (ARSL) is calculated for the entire trunk highway system as well as for each ATP. Service life is added when some type of maintenance or rehabilitation is done on a pavement section. Service life is lost when the condition of a pavement section deteriorates due to aging. The ARSL of the highway system increases if the projects being done add more life to the system than the sum of the deterioration of all the other sections.

PERFORMANCE CATEGORIES

MnDOT currently categorizes pavement condition, as measured by the RQI, into five equal categories as shown in Table 1. When reporting performance measures, the top two and bottom two categories are combined and referred to as "Good" and "Poor," respectively. These terms will be used for the remainder of this report.

Table 1. Ride Quality Index (RQI) Performance Categories

Descriptive Category	RQI Range	Performance Measure Category
Very Good	5.0 – 4.1	Good
Good	4.0 – 3.1	
Fair	3.0 – 2.1	
Poor	2.0 – 1.1	Poor
Very Poor	1.0 – 0.0	

PERFORMANCE TARGETS

For reporting statewide pavement conditions, MnDOT breaks the trunk highway system down into three systems: Interstate, Other-NHS, and Non-NHS. Each has its own set of targets.

In 2019, Minnesota's trunk highway system mileage was comprised of 12.7 percent Interstate, 40.5 percent Other-NHS, and 46.8 percent Non-NHS. ATP-2 and ATP-8 do not have any roads on the Interstate system.

MnDOT's targets for the Interstate system are 70 percent, or more, in "Good" condition and 2 percent, or less, in "Poor" condition. The targets for the Other-NHS system are 65 percent, or more, in "Good" condition and 4 percent, or less, in "Poor" condition. The targets for the Non-NHS system: 60 percent or more "Good" and 10 percent or less "Poor." These are shown in Table 2.

The Federal Highway Administration (FHWA) definitions of "Good," "Fair," and "Poor" are different than what is described above. Since this document is not intended to be the official document regarding MnDOT's pavement system with regard to the federal definitions and targets, the FHWA measures and targets will not be discussed in this report. That information can be obtained from MnDOT's annual Highway Performance Monitoring System (HPMS) submittal.

RQI targets are based on the percent of miles in the "Good" and "Poor" categories as shown in Table 2. These are statewide targets. It is recognized that some ATPs' pavements will be better than the targets and some will be worse. However, it is desirable to have the ATPs' pavements in somewhat similar conditions so that the public will not encounter drastic differences as they drive throughout the state.

Table 2. Ride Quality Index (RQI) Targets by System

System	Ride Quality Index (RQI)	
	"Good" RQI Target	"Poor" RQI Target
Interstate	70 percent or more	2 percent or less
Other-NHS	65 percent or more	4 percent or less
Non-NHS	60 percent or more	10 percent or less

STATEWIDE HISTORICAL RQI TRENDS

In 2019, the smoothness of the state highway system declined slightly with 44 fewer miles in the "Good" category and 18 more miles in the "Poor" category, compared to 2018. As was the case last year, most of the decline was on the Non-NHS system.

2010-2023 "Good" RQI Trend (Figure 2)

The percent of statewide miles in "Good" condition decreased from 71.1 percent in 2018 to 70.9 percent in 2019. The Interstate system declined from 82.8 percent to 81.5 percent, the Other-NHS system increased from 72.1 percent to 73.8 percent and the Non-NHS system decreased from 67.0 percent to 65.4 percent. In 2019 there were 10,134 roadway miles in "Good" condition, 44 fewer than there were in 2018.

Based on the pavement projects listed in the 2020-2023 State Transportation Improvement Program (STIP), the percent of miles in "Good" condition on the Interstate system is expected to be the same as its current value of 81.5 percent in 2023. The percent of miles in "Good" condition is expected to decrease on the Other-NHS system, from its current value of 73.8 percent to 69.9 percent. The Non-NHS system is also expected to have a reduction in the miles of roads in "Good" condition, from 65.4 percent to 63.0 percent. This results in an overall expected decrease of 166 miles of "Good" road over the next four years.

2010-2023 "Poor" RQI Trend (Figure 3)

The percent of statewide miles in "Poor" condition increased from 3.5 percent in 2018 to 3.6 percent in 2019. The Interstate system had 1.3 percent "Poor", compared to 1.2 percent in 2018. The Other-NHS system improved with a decrease in "Poor" from 1.7 percent to 1.4 percent. The Non-NHS system had an increase in "Poor" from 5.7 percent to 6.1 percent. In 2019 there were 521 roadway miles in Poor condition, 18 more miles than there were in 2018.

Based on the pavement projects listed in the 2020-2023 STIP, all three systems are expected to worsen and have an increase in the percent of miles in "Poor" condition over the next four years. The Interstate system is expected to increase from 1.3 percent "Poor" to 1.9 percent. The Other-NHS system is expected increase from 1.4 percent "Poor" to 3.4 percent. The Non-NHS system is expected to increase from 6.1 percent to 6.3 percent. This results in an overall expected increase of 80 miles of "Poor" road over the next four years.

Once a pavement falls into the "Poor" category it normally will require major rehabilitation or reconstruction to restore any meaningful amount of service life. These types of repairs are expensive, thus making it much harder with a limited budget to recover once the amount of miles in this condition becomes very high.

RQI COMPARISON BY ATP

"Good" RQI Comparison (Figures 4, 6, 7 and 8)

On the Interstate system, only ATP-1 had an increase in the number of miles in "Good" condition (4 miles) in 2019 while all of the others had a decrease. ATP-6 had the largest decrease (10 miles). This is shown in Figure 4 and Figure 6.

On the Other-NHS system, half the eight ATP's had an increase in the number of miles in "Good" condition and half a decrease or stayed the same. Metro had the largest increase (43 miles) while ATP-4 had the largest decrease (25 miles). This is shown in Figure 4 and Figure 7.

On the Non-NHS system, three ATP's had an increase in the number of miles in the "Good" category while the rest had a decrease. ATP-1 had the largest increase (20 miles). ATP-8 had the largest decrease with a loss of 47 miles in the "Good" category in 2019. This is shown in Figure 4 and Figure 8.

"Poor" RQI Comparison (Figures 5, 9, 10, and 11)

The Interstate system saw very little change in 2019, in terms of the amount of "Poor" roads. ATP-7 had 2 fewer miles in "Poor" and Metro had 4 miles more. ATP-1, 3, 4 and 6 all remained unchanged, compared to 2018. This is shown in Figure 5 and Figure 9.

The amount of "Poor" roads on the Other-NHS system declined in 2019. Overall, there are 20 fewer miles in "Poor" condition in 2019 than in 2018. ATP-1 had the biggest change, with a reduction of 8 miles of "Poor" in 2019. This is shown in Figure 5 and Figure 10.

The amount of "Poor" roads on the Non-NHS system increased by 36 miles in 2019, compared to 2018. ATP-6 had the largest increase (15 miles) followed by Metro (10 miles). ATP-1 and 8 both had a slight drop in the amount of roads in "Poor" condition while ATP-4 remained the same as last year. This is shown in Figure 5 and Figure 11.

AVERAGE REMAINING SERVICE LIFE (ARSL)

The Average Remaining Service Life (ARSL) is defined as the number of years until the RQI reaches a value of 2.5 or less. This is the point where most people begin to complain that a road's roughness is objectionable and some type of major rehabilitation is likely needed.

2010-2019 ARSL Trend (Figure 12)

The 2019 ARSL was 15.9 years on the Interstate system, 10.9 years on the Other-NHS system, and 8.1 years on the Non-NHS, very similar to what they were last year. The ARSL of the Interstate system remained the same at

15.9 years, its highest level ever. The ARSL of the Other-NHS system increased from 10.6 years to 10.9 years while the Non-NHS system dropped from 8.2 years to 8.1 years. This is shown in Figure 12.

ARSL Comparison (Figure 13)

By ATP, the ARSL of the Interstate system ranges from 11.3 years (ATP-7) to 21.7 years (ATP-1). The ARSL of the Other-NHS system ranges from 9.1 years (ATP-1) to 12.4 years (ATP-3). The ARSL of the Non-NHS system ranges from 5.4 (ATP-7) to 9.6 (ATP-4). This is shown in Figure 13.

PREDICTED PAVEMENT CONDITIONS AND ACCURACY

Future year's pavement conditions are predicted using the pavement management system. These predictions are used to provide managers with insight into the impact different funding scenarios will have on pavement conditions. The accuracy of these predictions is reviewed yearly to reassure management that the pavement management system is operating correctly, therefore making it a reliable tool for predicting future needs.

The prediction of future pavement conditions relies on regression curves built into the pavement management system. The curves are either based on section specific historical data or statewide data. If there is adequate historical data since the last rehabilitation on a section, a regression curve is fit through the data and used to predict the RQI. If there is inadequate historical data for the section, or if the regression through the historical data results in an unrealistic curve, then a default curve is used to predict the future RQI. Default curves were developed for all pavement fixes in the pavement management system in the mid-1980s and subsequently updated in 1992 and 2008. The default curves are based on historical statewide performance. For pavement sections scheduled for work during the STIP, default regression curves are used to predict future conditions.

Table 3 compares the predicted 2019 pavement conditions, using last year's data, with the actual 2019 measured conditions.

Table 3. Comparison of Predicted 2019 and Actual 2019 RQI by System (percent of miles)

Interstate System RQI Category	Actual 2018 Data	Predicted 2019 Data *	Actual 2019 Data	Difference (Actual vs. Predicted)
Good RQI (RQI > 3.0)	82.8	84.8	81.5	-3.3
Poor RQI (RQI ≤ 2.0)	1.2	1.0	1.3	+0.3
Other-NHS System RQI Category	**Actual 2018 Data**	**Predicted 2019 Data ***	**Actual 2019 Data**	**Difference (Actual vs. Predicted)**
Good RQI (RQI > 3.0)	72.1	73.0	73.8	+0.8
Poor RQI (RQI ≤ 2.0)	1.7	1.8	1.4	-0.4
Non-NHS System RQI Category	**Actual 2018 Data**	**Predicted 2019 Data ***	**Actual 2019 Data**	**Difference (Actual vs. Predicted)**
Good RQI (RQI > 3.0)	67.0	68.1	65.4	-2.7
Poor RQI (RQI ≤ 2.0)	5.7	5.1	6.1	+1.0

*Predictions based on the 2019-2022 STIP by 2018 M-Records

The actual 2019 conditions are close to what they were predicted to be last year, with all predictions being within 3.5% percent of what was predicted. Differences between actual and predicted conditions can be attributed to one, or more, the following.

1. Construction projects being advanced, reducing "Poor" and increasing "Good"
2. Construction projects not completed, keeping "Poor" from becoming "Good"
3. Changes in the STIP, either advances, delays, or additions
4. Maintenance work, keeping roads from falling into "Poor" or out of "Good"
5. A change in a road's rate of deterioration (either faster or slower)
6. Unforeseen funding or projects, such as the IDIQ program, improving the road

GOVERNMENT ACCOUNTING STANDARDS BOARD, STATEMENT 34 (GASB 34)

The Government Accounting Standards Board (GASB), a private, nonprofit organization, was established in 1984 by the Financial Accounting Foundation. The Foundation oversees GASB, provides funding, and appoints the members of GASB's board. The Foundation has a similar relationship with GASB's sister organization, the private-sector, standard-setting Financial Accounting Standards Board. GASB's span of influence covers over 84,000 state, county, and other local governmental units. Also impacted by GASB's financial reporting standards are organizations such as public utilities, municipal hospitals, and state universities. GASB, which does not impact the federal government, establishes concepts and standards that guide the preparation of external financial reports. GASB establishes generally accepted accounting principles that are utilized by auditors charged with evaluating state and local government financial statements.

In June 1999, GASB established a new financial reporting standard that fundamentally changed the way state and local governments report their financial results. Among other provisions, GASB Statement 34 (GASB 34), "Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments," requires that major infrastructure assets acquired or having major additions or improvements in fiscal years

beginning after June 15, 1980, be capitalized in financial statements. In addition, the cost of using the assets must be reflected. Source: U.S. Department of Transportation, Federal Highway Administration, Office of Asset Management, Primer: GASB 34 (November 2002).

One of the primary purposes of GASB 34 is to demonstrate to the public, and others, that the agency is maintaining its infrastructure in an acceptable condition and does not have any undisclosed liabilities looming in the future.

In terms of determining the cost of using the assets, GASB 34 allows governments to report either a depreciation expense or to apply an alternative modified/preservation approach. Governments may use the modified approach in lieu of depreciating their assets if they have a systematic approach to managing their assets that, at a minimum, meets the following four requirements:

- Having a current inventory of eligible assets
- Documenting the condition of those assets via a reproducible assessment procedure
- Demonstrating that assets are being preserved at a level predetermined by the government
- Estimating the actual cost to maintain and preserve the assets.

MnDOT has chosen to use the modified/preservation approach since it can meet all the requirements listed above. For the purposes of GASB 34, MnDOT established that the state highway system will be maintained, at a minimum, at the following levels.

- Principal Arterial System: Average PQI of 3.0 or higher
- Non-Principal Arterial System: Average PQI of 2.8 or higher

Figure 14 shows how actual and predicted pavement conditions, based on the 2019-2022 STIP, compare with the established GASB 34 levels.

As shown in Figure 14, both the PA and NPA systems are expected to be safely above the GASB 34 minimum thresholds throughout the entire STIP.

ADDITIONAL INFORMATION

Additional information about the condition and performance of the state highway system, including color-coded maps of the most recent indices, can be obtained from the Pavement Management Unit's website: http://www.dot.state.mn.us/materials/pvmtmgmt.html

Or by contacting:

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Figure 1. MnDOT's Area Transportation Partnership (ATP) Boundaries

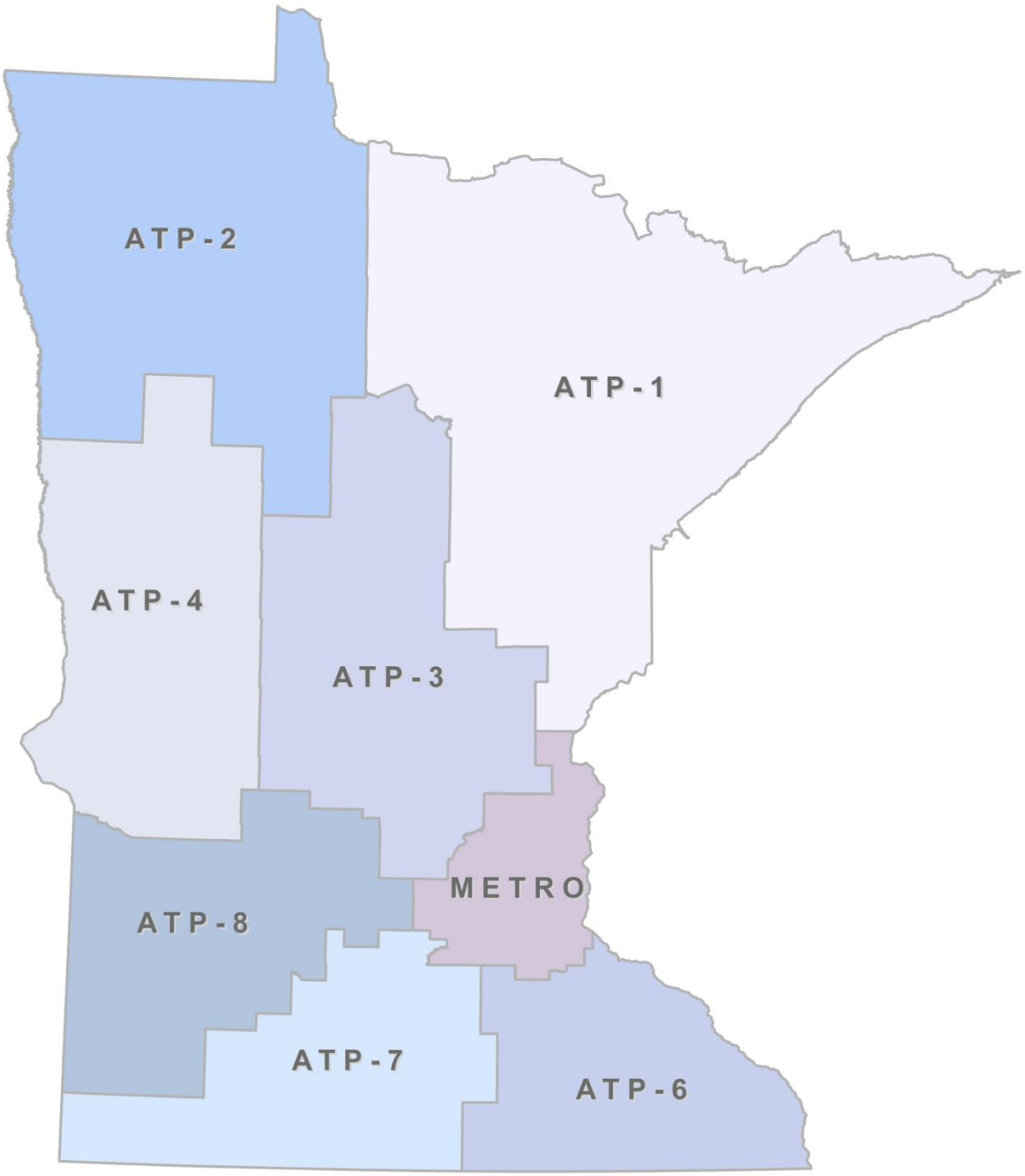
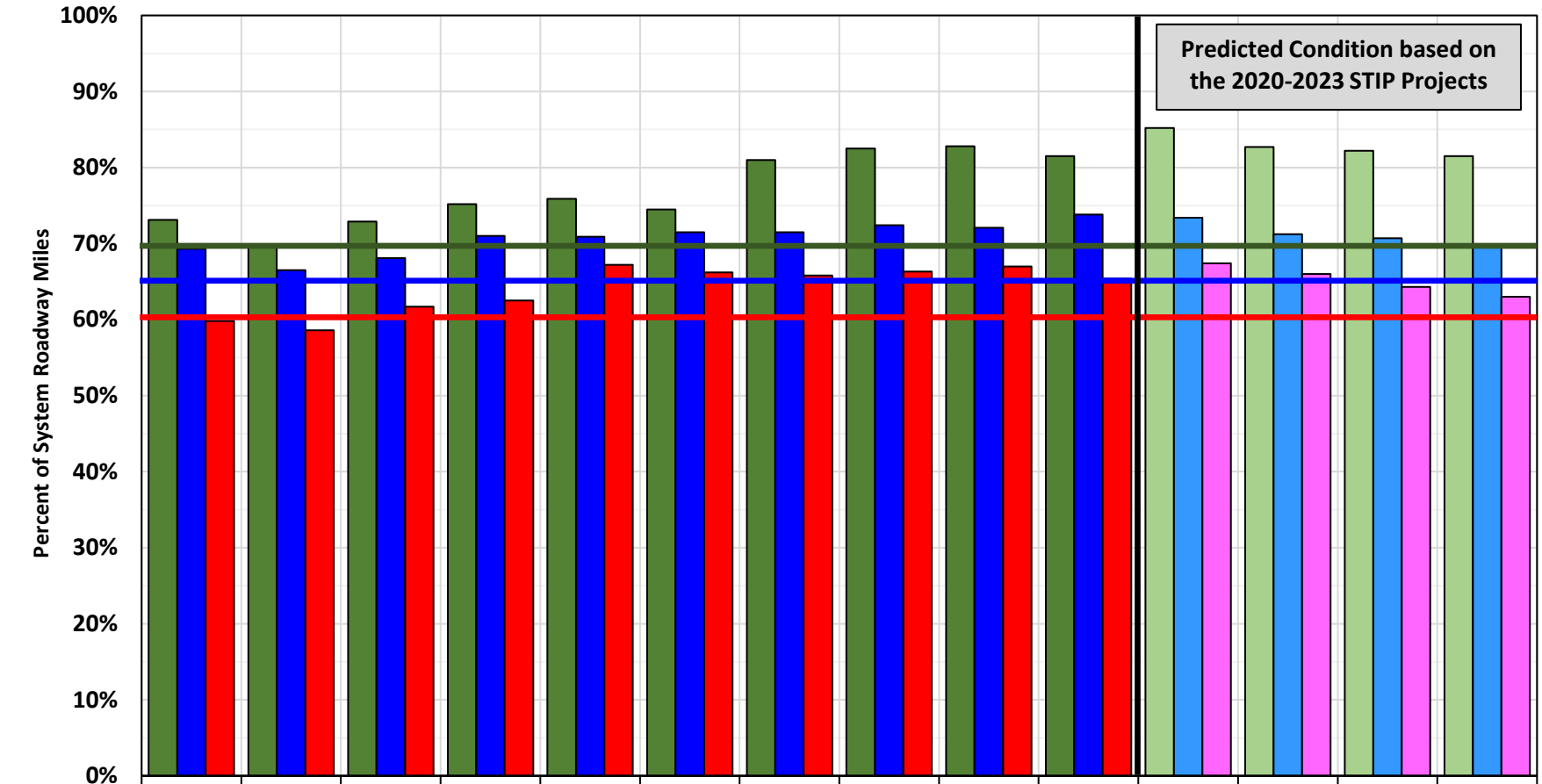


Figure 2

Statewide "Good" Ride Quality Index

(percent of roadway miles with an RQI greater than 3.0)

Actual 2010-2019, Predicted 2020-2023



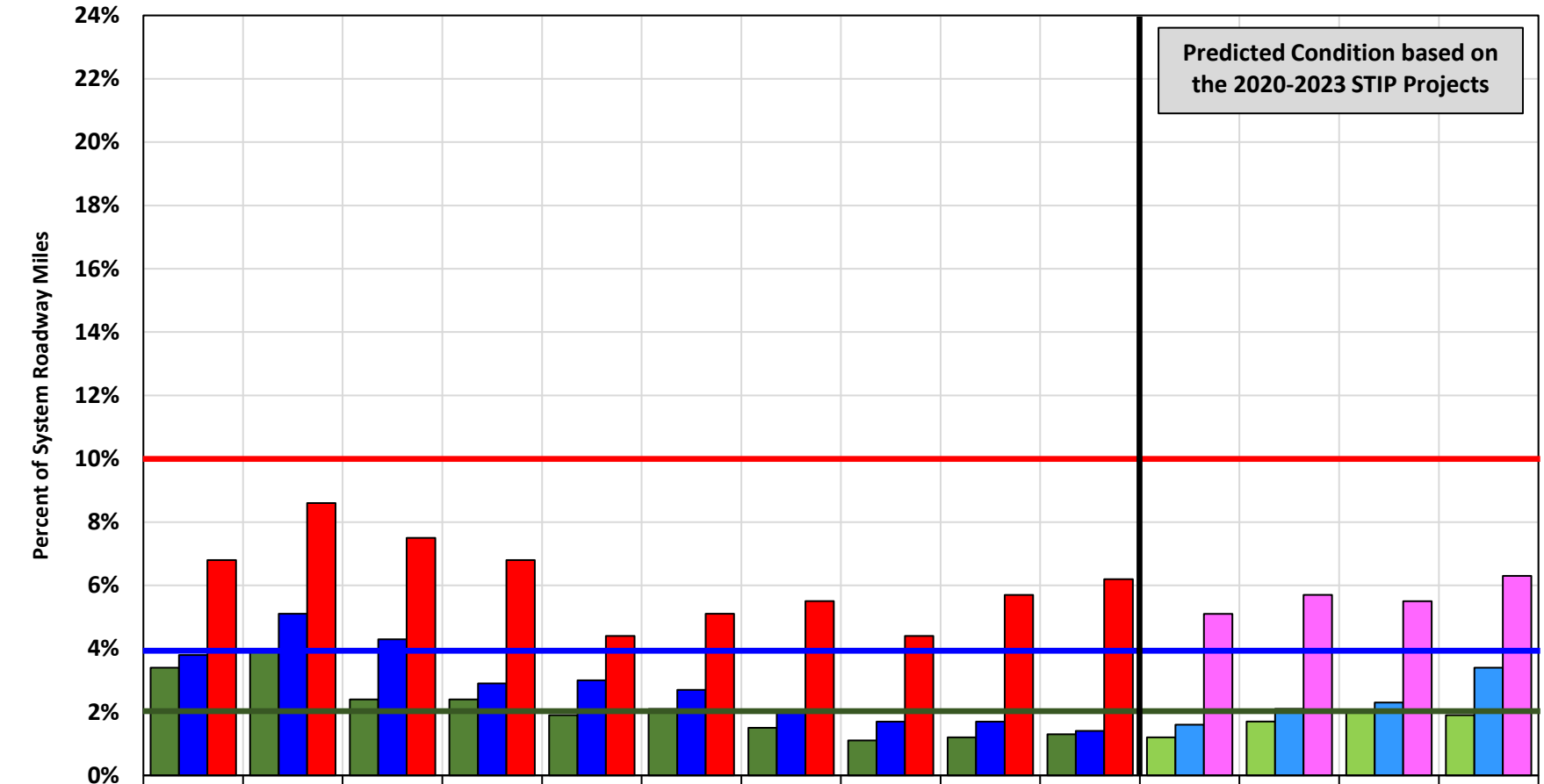
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Interstate	73.1%	69.8%	72.9%	75.2%	75.9%	74.5%	81.0%	82.5%	82.8%	81.5%	85.2%	82.7%	82.2%	81.5%
Other-NHS	69.3%	66.5%	68.1%	71.0%	70.9%	71.5%	71.5%	72.4%	72.1%	73.8%	73.4%	71.2%	70.7%	69.9%
Non-NHS	59.8%	58.6%	61.7%	62.5%	67.2%	66.2%	65.8%	66.3%	67.0%	65.4%	67.4%	66.0%	64.3%	63.0%

Figure 3

Statewide "Poor" Ride Quality Index

(percent of roadway miles with an RQI of 2.0 or less)

Actual 2010-2019, Predicted 2020-2023



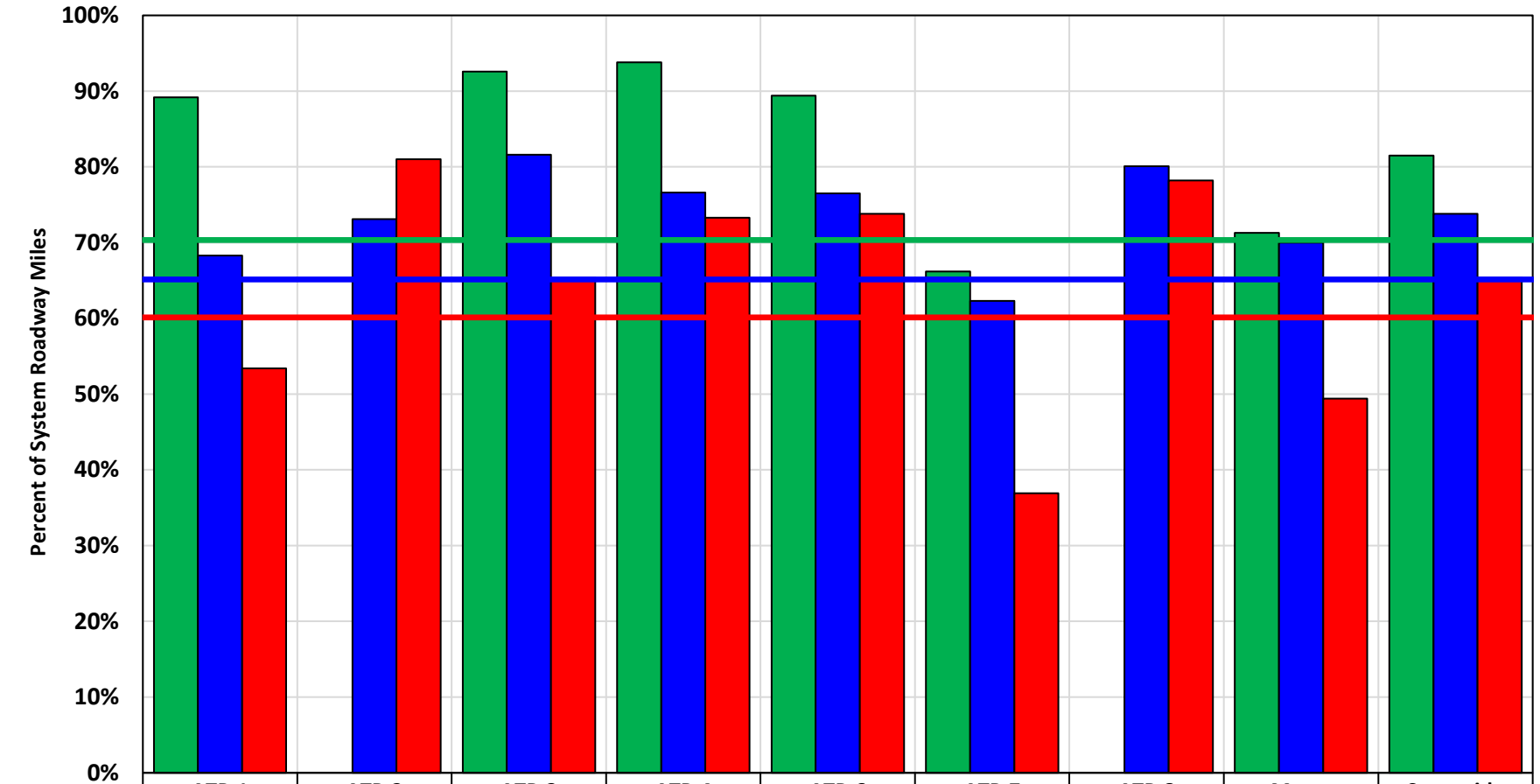
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Interstate	3.4%	3.9%	2.4%	2.4%	1.9%	2.1%	1.5%	1.1%	1.2%	1.3%	1.2%	1.7%	2.0%	1.9%
Other-NHS	3.8%	5.1%	4.3%	2.9%	3.0%	2.7%	2.0%	1.7%	1.7%	1.4%	1.6%	2.1%	2.3%	3.4%
Non-NHS	6.8%	8.6%	7.5%	6.8%	4.4%	5.1%	5.5%	4.4%	5.7%	6.2%	5.1%	5.7%	5.5%	6.3%

Figure 4

"Good" Ride Quality Index

(percent of roadway miles with an RQI greater than 3.0)

Comparison of 2019 Data by ATP



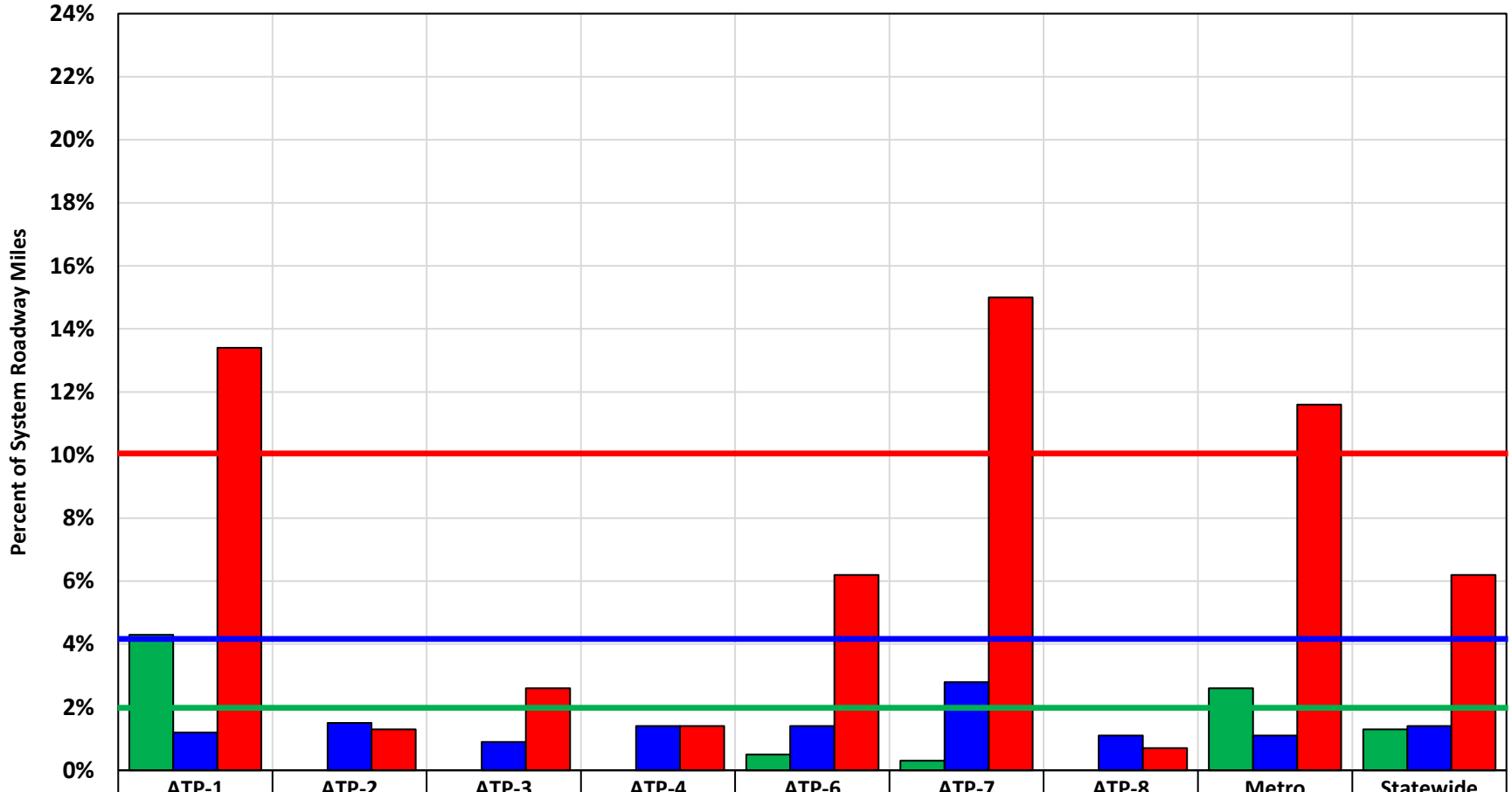
	ATP-1	ATP-2	ATP-3	ATP-4	ATP-6	ATP-7	ATP-8	Metro	Statewide
Interstate	89.2%		92.6%	93.8%	89.4%	66.2%		71.3%	81.5%
Other-NHS	68.3%	73.1%	81.6%	76.6%	76.5%	62.3%	80.1%	70.0%	73.8%
Non-NHS	53.4%	81.0%	65.4%	73.3%	73.8%	36.9%	78.2%	49.4%	65.4%

Figure 5

"Poor" Ride Quality Index

(percent of roadway miles with an RQI of 2.0 or less)

Comparison of 2019 Data by ATP



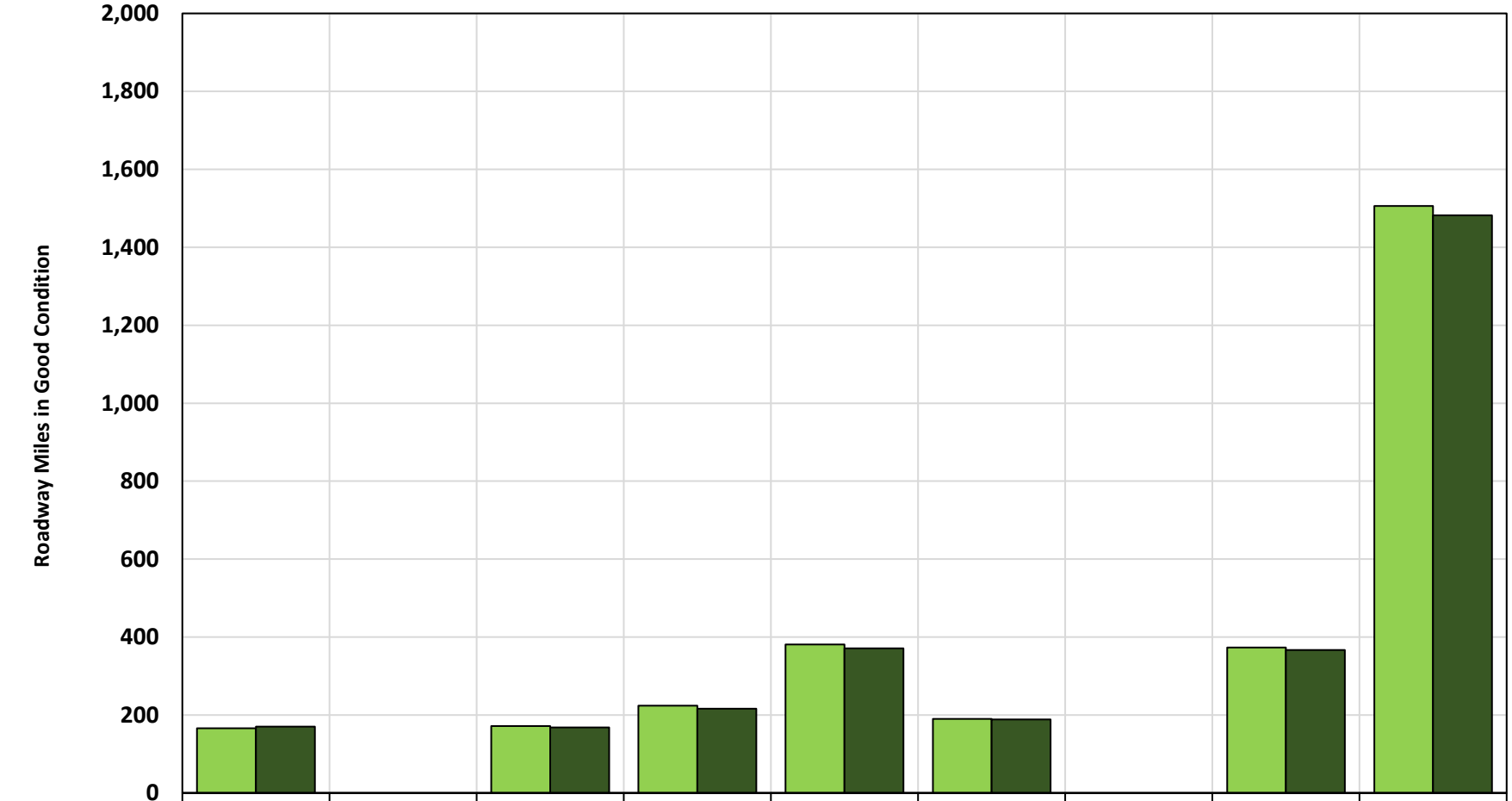
	ATP-1	ATP-2	ATP-3	ATP-4	ATP-6	ATP-7	ATP-8	Metro	Statewide
Interstate	4.3%		0.0%	0.0%	0.5%	0.3%		2.6%	1.3%
Other-NHS	1.2%	1.5%	0.9%	1.4%	1.4%	2.8%	1.1%	1.1%	1.4%
Non-NHS	13.4%	1.3%	2.6%	1.4%	6.2%	15.0%	0.7%	11.6%	6.2%

Figure 6

Comparison of "Good" Ride Quality Index

(roadway miles with an RQI greater than 3.0)

Interstate System, 2018 -vs- 2019 Condition



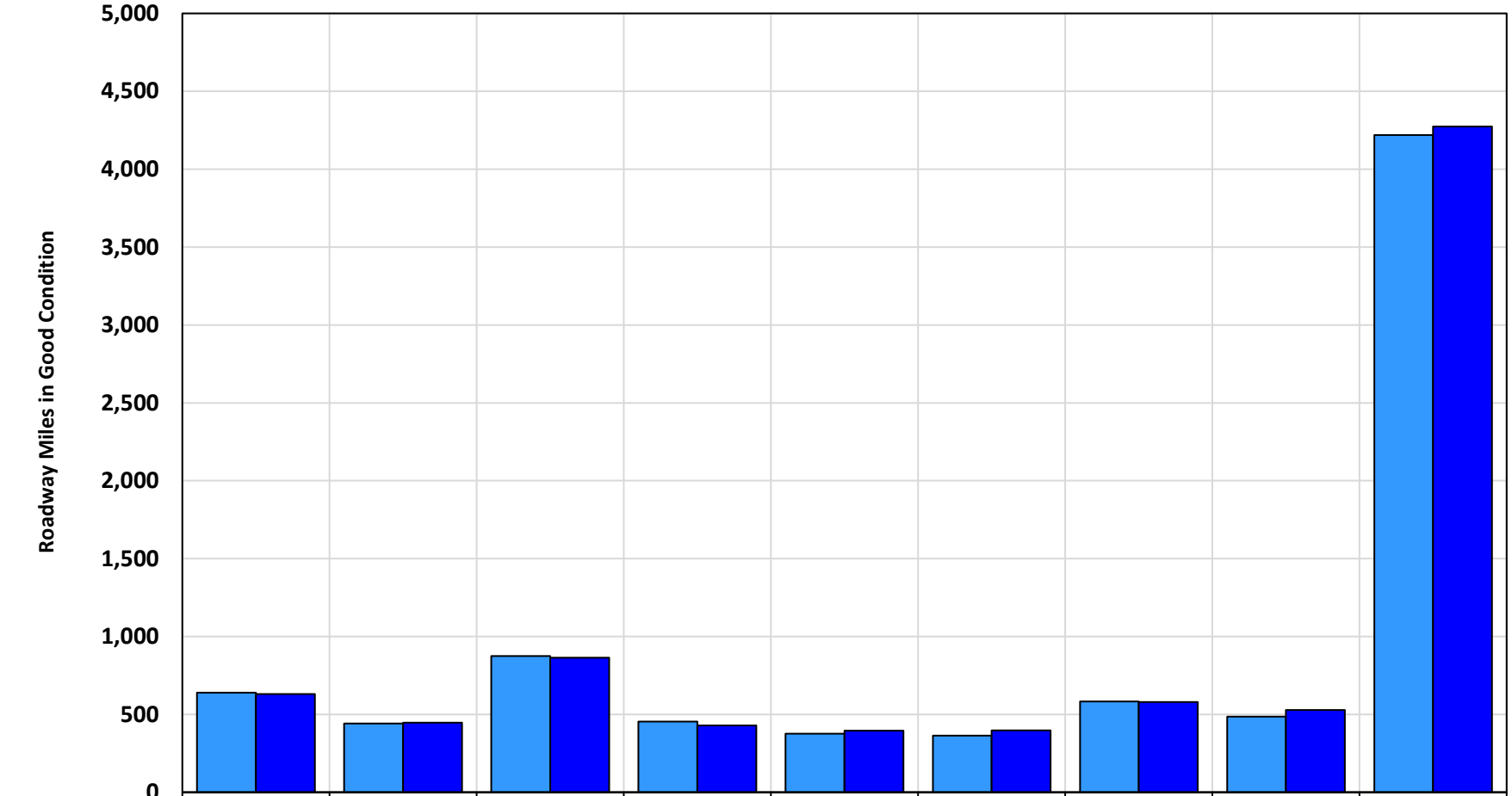
	ATP-1	ATP-2	ATP-3	ATP-4	ATP-6	ATP-7	ATP-8	Metro	Statewide
2018 Condition	166		172	224	381	190		373	1,506
2019 Condition	170		168	216	371	189		367	1,482

Figure 7

Comparison of "Good" Ride Quality Index

(roadway miles with an RQI greater than 3.0)

Other-NHS System, 2018 -vs- 2019 Condition



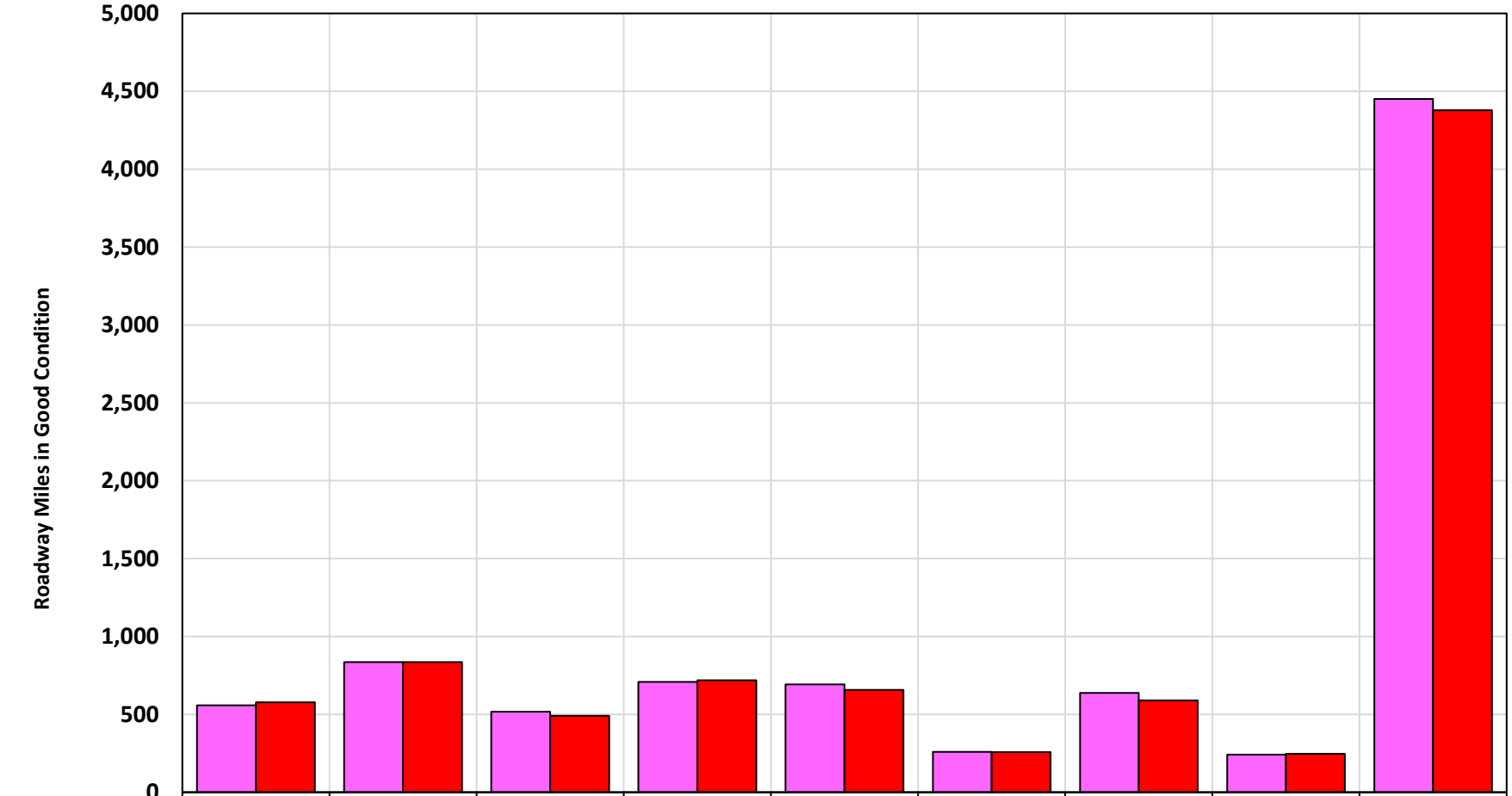
	ATP-1	ATP-2	ATP-3	ATP-4	ATP-6	ATP-7	ATP-8	Metro	Statewide
2018 Condition	640	442	874	454	376	364	583	486	4,220
2019 Condition	631	447	864	429	396	397	580	529	4,273

Figure 8

Comparison of "Good" Ride Quality Index

(roadway miles with an RQI greater than 3.0)

Non-NHS System, 2018 -vs- 2019 Condition



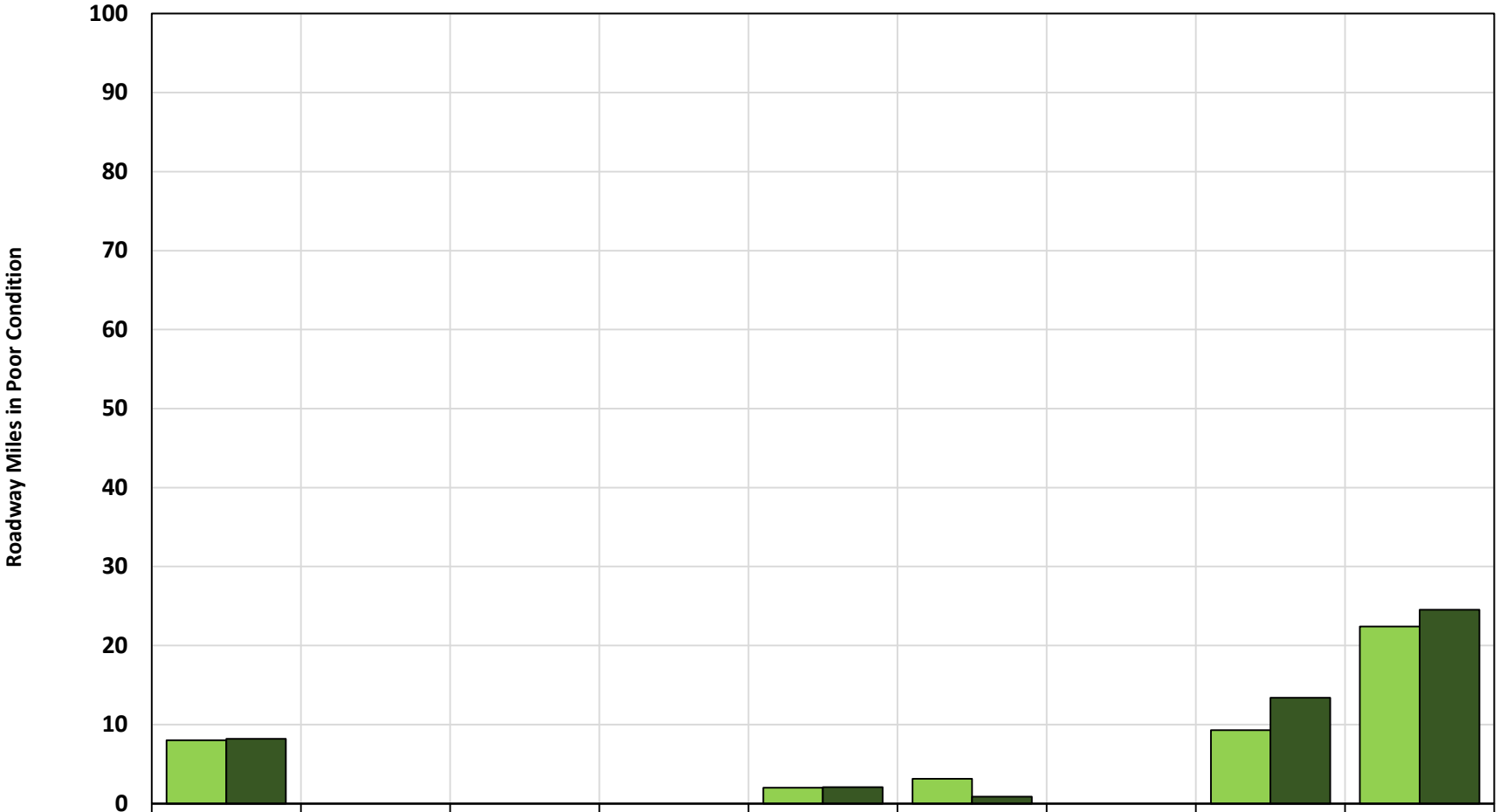
	ATP-1	ATP-2	ATP-3	ATP-4	ATP-6	ATP-7	ATP-8	Metro	Statewide
2018 Condition	558	836	518	708	693	259	638	242	4,451
2019 Condition	578	836	492	720	658	257	591	247	4,379

Figure 9

Comparison of "Poor" Ride Quality Index

(roadway miles with an RQI of 2.0 or less)

Interstate System, 2018 -vs- 2019 Condition



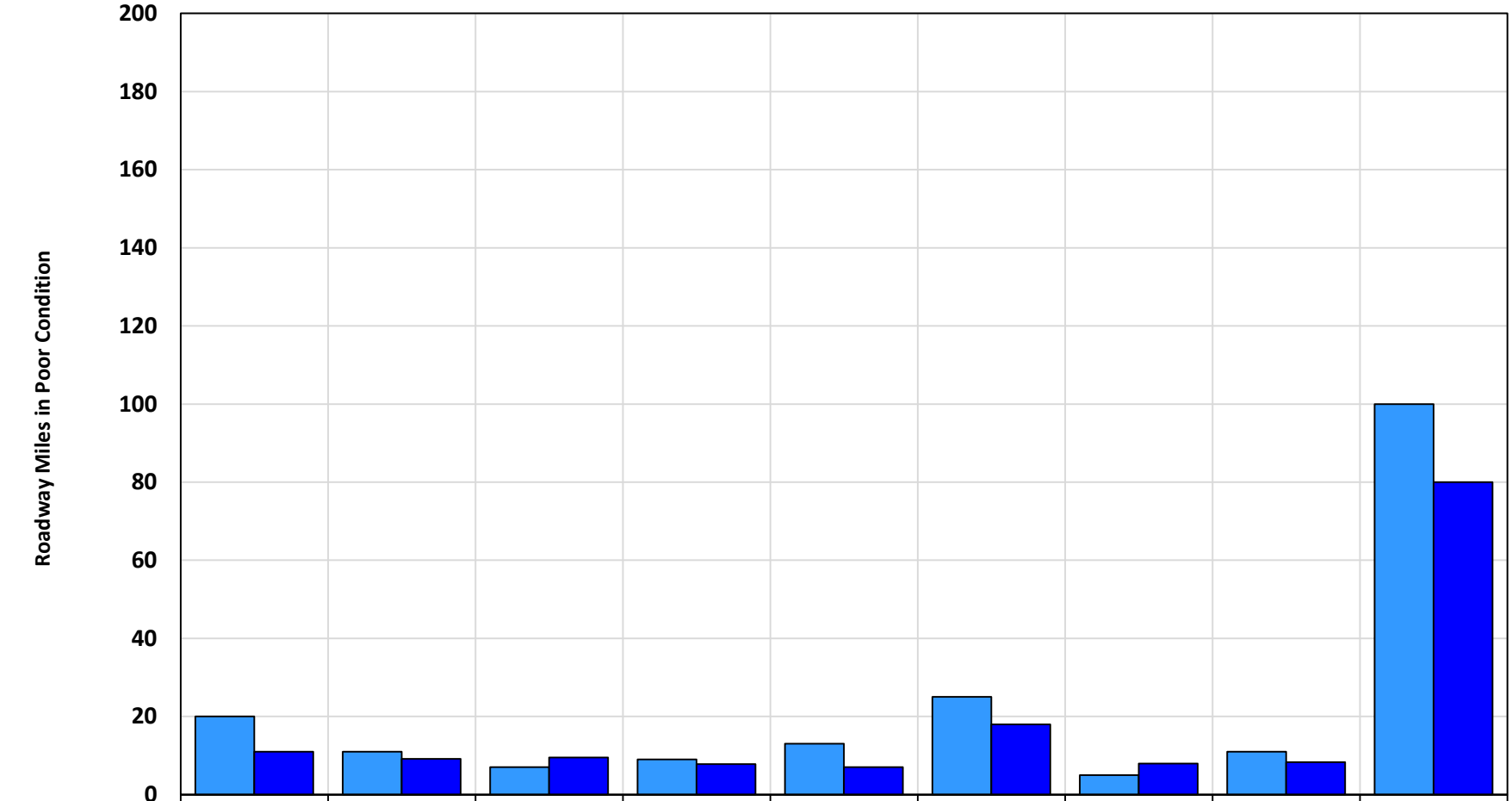
	ATP-1	ATP-2	ATP-3	ATP-4	ATP-6	ATP-7	ATP-8	Metro	Statewide
2018 Condition	8		0	0	2	3		9	22
2019 Condition	8		0	0	2	1		13	25

Figure 10

Comparison of "Poor" Ride Quality Index

(roadway miles with an RQI of 2.0 or less)

Other-NHS System, 2018 -vs- 2019 Condition



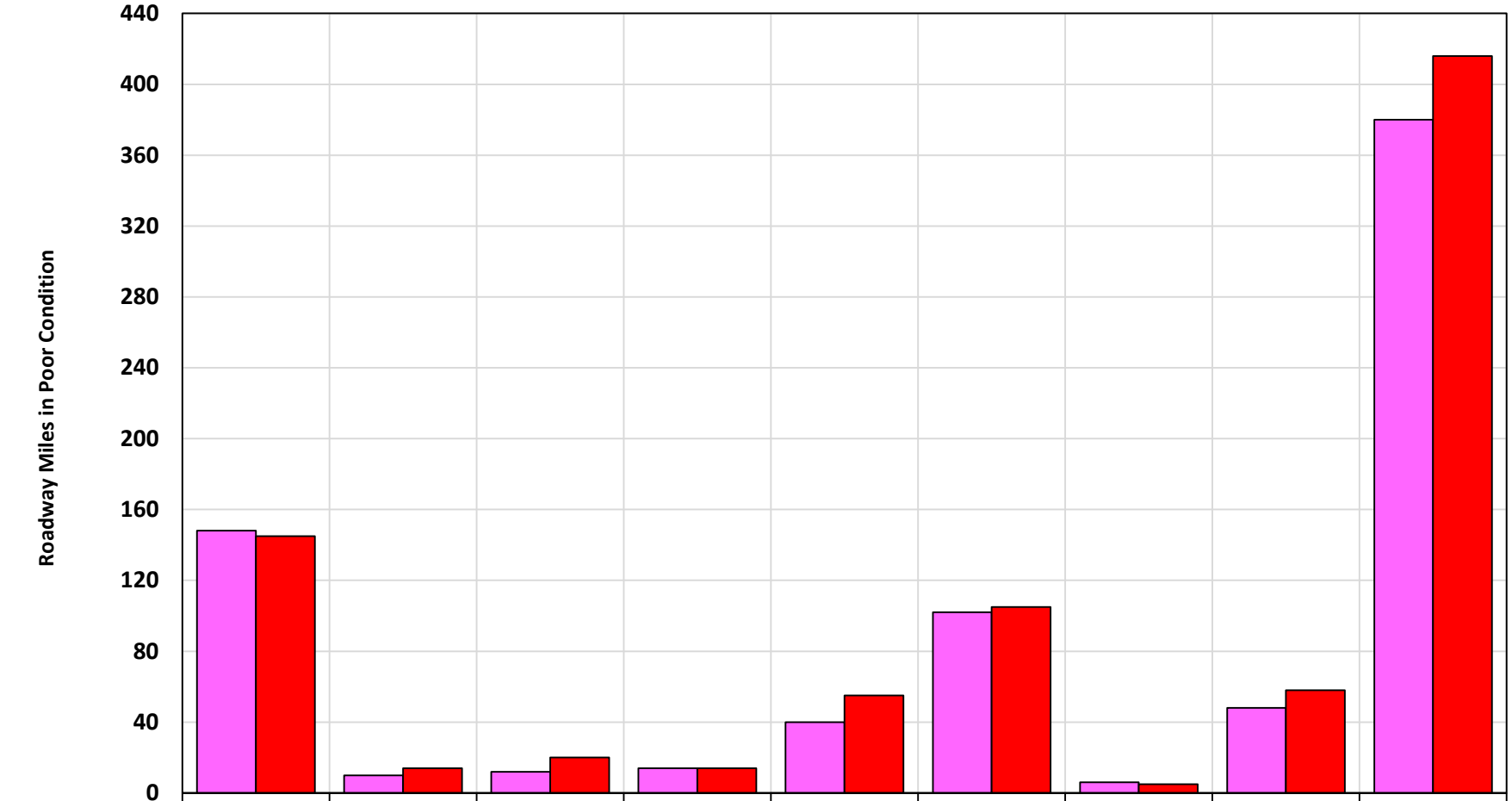
	ATP-1	ATP-2	ATP-3	ATP-4	ATP-6	ATP-7	ATP-8	Metro	Statewide
2018 Condition	20	11	7	9	13	25	5	11	100
2019 Condition	11	9	10	8	7	18	8	8	80

Figure 11

Comparison of "Poor" Ride Quality Index

(roadway miles with an RQI of 2.0 or less)

Non-NHS System, 2018 -vs- 2019 Condition



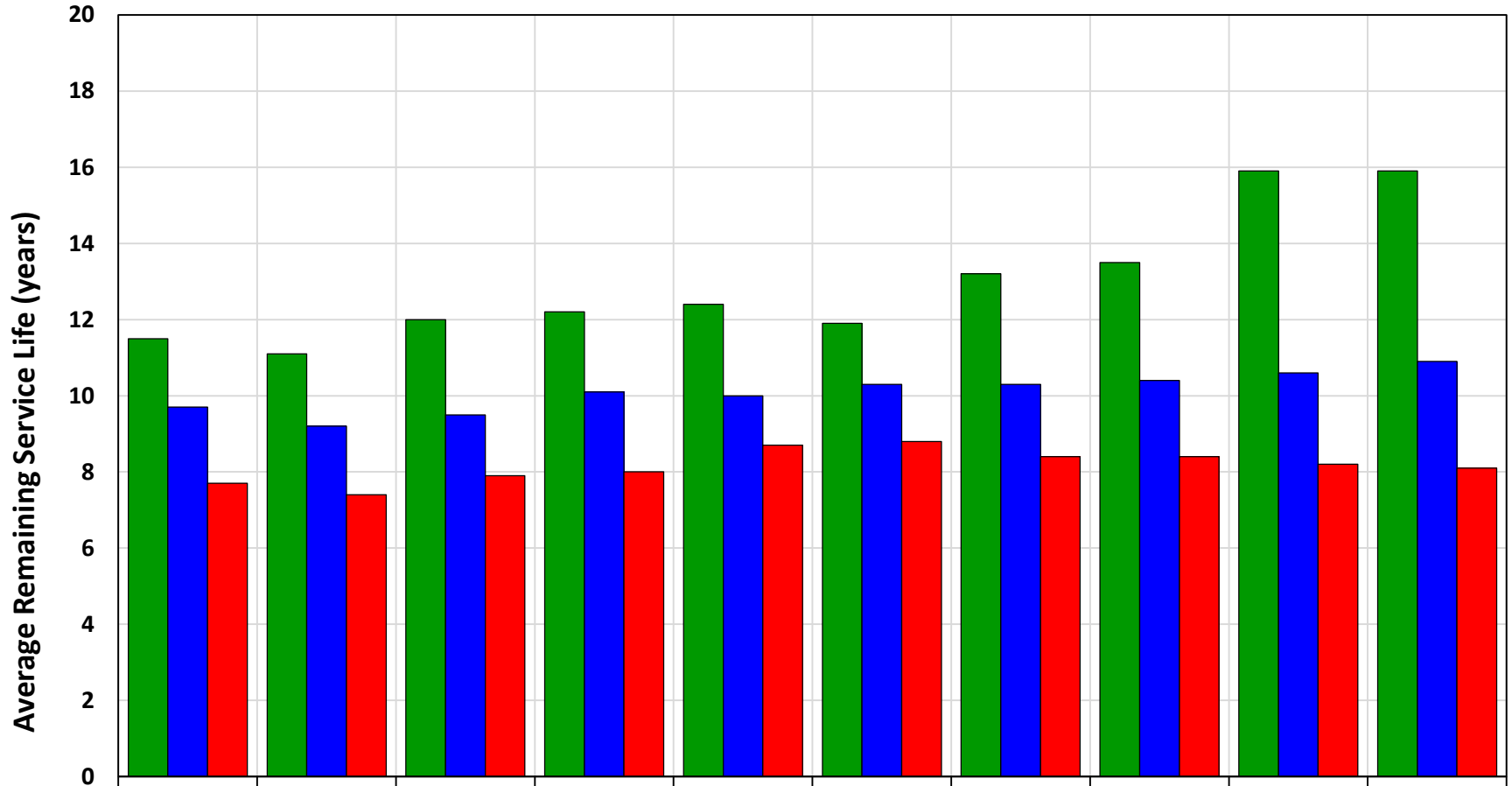
	ATP-1	ATP-2	ATP-3	ATP-4	ATP-6	ATP-7	ATP-8	Metro	Statewide
2018 Condition	148	10	12	14	40	102	6	48	380
2019 Condition	145	14	20	14	55	105	5	58	416

Figure 12

Statewide Average Remaining Service Life (ARSL)

(years until RQI is predicted to reach 2.5, assuming no future work is done)

Actual 2010-2019



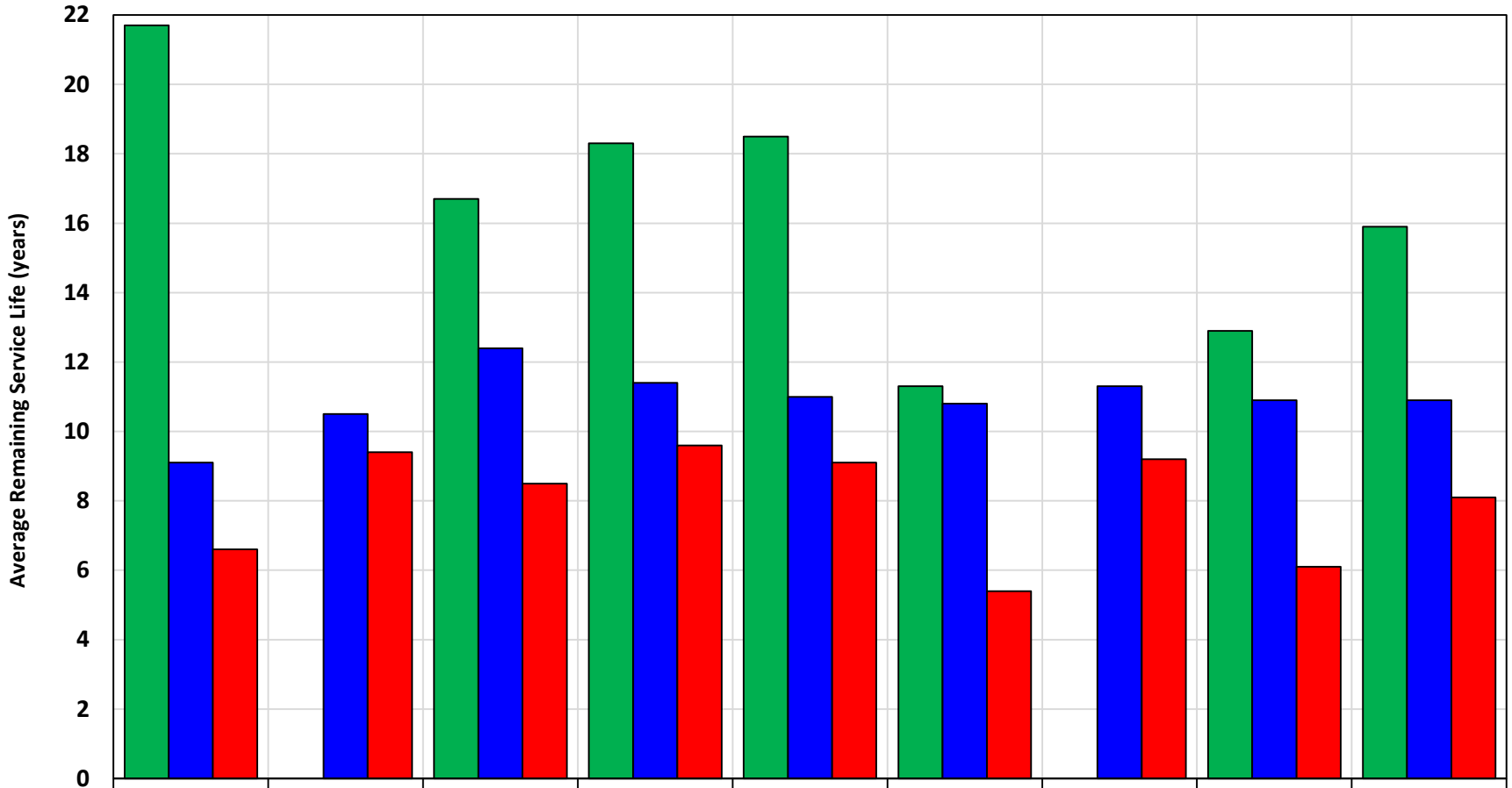
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Interstate	11.5	11.1	12.0	12.2	12.4	11.9	13.2	13.5	15.9	15.9
Other-NHS	9.7	9.2	9.5	10.1	10.0	10.3	10.3	10.4	10.6	10.9
Non-NHS	7.7	7.4	7.9	8.0	8.7	8.8	8.4	8.4	8.2	8.1

Figure 13

Average Remaining Service Life (ARSL)

(years until RQI is predicted to reach 2.5, assuming no future work is done)

Comparison of 2019 Data by ATP



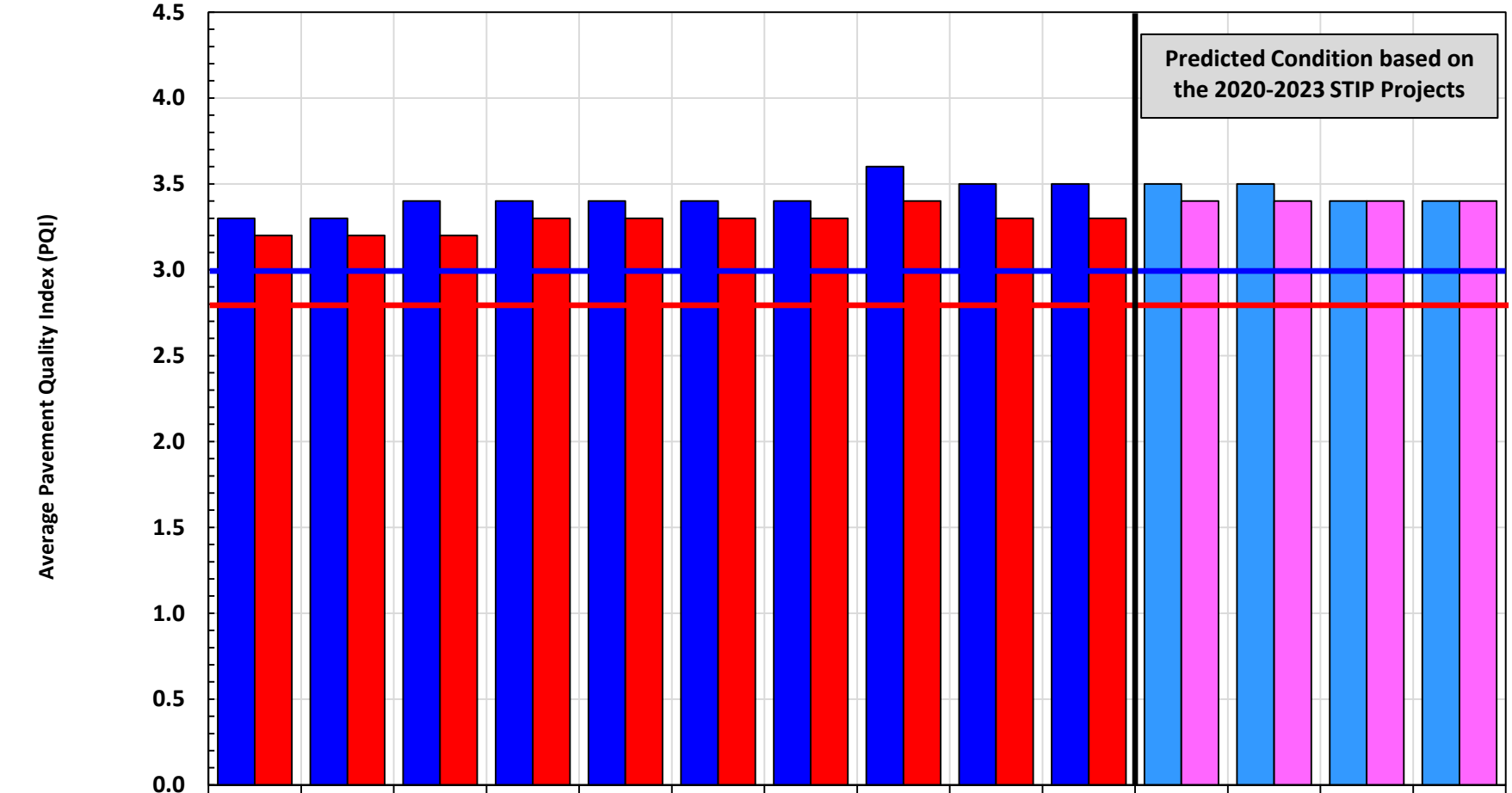
	ATP-1	ATP-2	ATP-3	ATP-4	ATP-6	ATP-7	ATP-8	Metro	Statewide
Interstate	21.7		16.7	18.3	18.5	11.3		12.9	15.9
Other-NHS	9.1	10.5	12.4	11.4	11.0	10.8	11.3	10.9	10.9
Non-NHS	6.6	9.4	8.5	9.6	9.1	5.4	9.2	6.1	8.1

Figure 14

Statewide Average Pavement Quality Index (PQI)

for GASB 34 Reporting

(PQI = Combined Index of Pavement Smoothness and Cracking)



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Principal Art.	3.3	3.3	3.4	3.4	3.4	3.4	3.4	3.6	3.5	3.5	3.5	3.5	3.4	3.4
Non-Principal Art.	3.2	3.2	3.2	3.3	3.3	3.3	3.3	3.4	3.3	3.3	3.4	3.4	3.4	3.4