CENTRAL INDIANA ASSET MANAGEMENT REPORT

Analysis of Central Indiana Asset Management Plans

September 2021

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1 CONTENTS

2 INTRODUCTION

2.1 PURPOSE OF THIS DOCUMENT

The Indianapolis Metropolitan Planning Organization (IMPO) programs funding for Central Indiana cities, towns, and counties. These local municipalities maintain their transportation assets and are required to have an asset management plan to be eligible for Indiana Department of Transportation (INDOT)'s Community Crossings Matching Grant. The Community Crossings Matching Grant Program was started in 2016 and provides funding to cities, towns, and counties across Indiana to make improvements to local roads and bridges. Depending on the Local Public Agency's (LPA) population size, the LPAs receive differing amounts of matching funds from INDOT to help fund their pavement and bridge projects.

This Asset Management Report was completed pursuant to IC.36-7-7.7-11, which requires the IMPO to develop a comprehensive asset management report compiling and analyzing the transportation asset management plans of each eligible political subdivision that is a member of the IMPO.

> *Sec. 11.*
>
> *Before October 1, 2021, the MPO shall do the following:*
>
> *(1) Develop a comprehensive asset management report, in collaboration with the Indiana Department of Transportation centralized electronic statewide asset management data base developed under IC 8-14-3-3, which analyzes and compiles the transportation asset management plans of each eligible political subdivision that is a member of the MPO.*
>
> *(2) Present the comprehensive asset management report described in subdivision (1) to:*
>
> > *(A) the city-county council of the consolidated city;*
> >
> > *(B) the fiscal and legislative bodies of each entity that is a member of the MPO; and*
> >
> > *(C) the budget committee.*

The legislation did not require the Asset Management Report to be completed until fall of 2021, however the IMPO proactively completed a report in 2020 that summarized the 2019 Asset Management Plans. INDOT has contracted with Purdue's Local Technical Assistance Program (LTAP) to maintain the centralized electronic statewide asset management database mentioned in the legislation.

In 2021 a new bill was passed to require INDOT, by July 31, 2022, to maintain the asset management plans on a publicly available website. This is now reflected in IC8-23-30-9

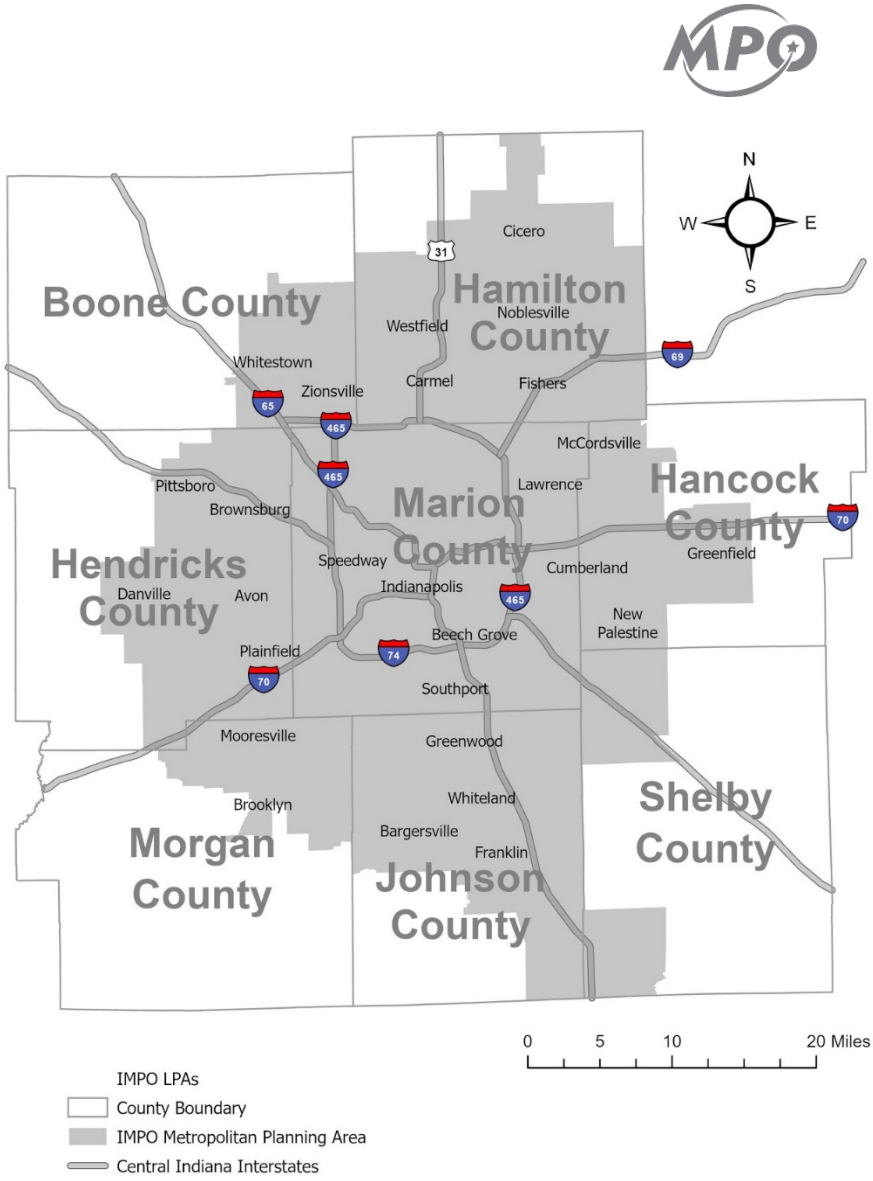
Not later than July 1, 2022, the department shall make asset management plans of local units approved under this chapter available in an electronic format specified by the department on an Internet web site maintained by:

***(1)** the department; or*
***(2)** an entity contracted by the department to approve asset management plans.*
IC 8-23-30-9

LTAP is the compliance reviewer for the Indiana LPA's Pavement and Bridge Asset Management Plans. Pavement Asset Management Plans have three required components that must be submitted to LTAP's Data Management System to be eligible for the Community Crossings program: a comprehensive pavement inventory with ratings; a 5-Year Treatment Plan; and Objectives and Measures. 33 out of the IMPO's 36 LPAs submitted Pavement Asset Management Plans to LTAP. The IMPO received 33 Pavement Inventories, 33 Pavement 5-Year Treatment Plans, 33 Pavement Objectives and Measures, and 8 Bridge Priority Plans. The Asset Management Plans only contain the roads and bridges that are maintained by the LPA's locally and do not include roads and bridges maintained by INDOT. This report summarizes Central Indiana's 2020 Asset Management Plans.

2.2 The Indianapolis Metropolitan Planning Organization

The Indianapolis Metropolitan Planning Organization is the designated MPO for Central Indiana. The IMPO's Metropolitan Planning Area (MPA) covers all or parts of 8 counties: Boone, Hamilton, Hendricks, Hancock, Hendricks, Johnson, Marion, Morgan, and Shelby. The IMPO has 36 members that cover over 1,500 square miles.



3 EXECUTIVE SUMMARY

3.1 ASSET MANAGEMENT

According to the *Asset Management Program Guidance for Indiana State Revolving Fund Loan Program* (Asset Management Program Guidance for Indiana State Revolving Fund Load Program, 2018), an Asset Management Program (AMP) is a document(s) developed to assist in the long-term management of the assets necessary to support cost effective, proactive decisions including creation, acquisition, operation & maintenance (O&M), and replacement/upgrade of assets. Physical components deteriorate over time, resulting in increased O&M costs or capital reinvestment to maintain the level of service expected.

These documents are intended to ensure long-term sustainability of transportation utilities and are considered "living documents" that are regularly referenced, revised, expanded, and implemented as an integral part of the operation and management of a transportation system. They provide a structured framework of the asset information to help determine when it is most appropriate to repair, replace, or rehabilitate a particular asset, as well as scheduling a long-term funding strategy to ensure sufficient funds will be available to implement improvements as needed.

3.1.1 Key Principles

The Indiana Department of Transportation (INDOT) established the following core principles for transportation asset management:

- ***Asset management is policy driven***. Policy based decisions account for specific economic, community, and environmental goals and objectives that reflect desired system conditions such as level of service and safety.

- ***Asset management is performance based.*** Objectives are translated into measurable performance-based criteria for regular and strategic use in managing decisions.

- ***Asset management involves analysis of options and trade-offs.*** Options are analyzed comparatively with a long-term perspective to determine how the allocation of resources across different assets, programs, and years affects the achievement of policy objectives. This approach typically focuses on asset preservation rather than asset reconstruction.

- ***Asset management relies on quality information***. Options are evaluated using current, credible data that is assessed, analyzed, tracked, and interpreted using appropriate decision support tools.

- ***Asset management provides clear accountability and feedback***. Performance results are monitored and reported to provide clear accountability for decision impacts and effectiveness and to provide feedback necessary to adjust or revise policy objectives and future resource allocation.

  (Indiana Department of Transportation, 2019)

3.1.2 Benefits

Transportation asset management systems with appropriate components in the context of key principles can provide great benefits to agencies, officials, and users. The main benefit, which is often the primary motivation for implementing asset management systems, is improved asset performance over time. Performance and practice improvements include:

- More coordinated activities across different assets,
- Decreased costs of long-term maintenance,
- Historic condition data that provides custom performance prediction models,
- Increased asset conditions overall,
- Higher levels of service and enhanced safety,
- Improved communications, and
- Better credibility of and accountability for resource allocation decisions.

(Indiana Department of Transportation, 2019)

3.1.3 Implementation Issues

Collecting and managing the data for asset management plans can be expensive and time consuming, making it challenging for smaller agencies to implement them.

3.2 Asset Management Plan Data

3.2.1 Pavement Rating Systems

There are two different pavement rating systems used by IMPO's LPAs; Pavement Surface Evaluation and Rating (PASER) and Pavement Condition Index (PCI). All IMPO's LPAs use the PASER rating system except for the City of Indianapolis, which uses PCI. PASER ratings were used on 68.75% of the pavement miles and PCI ratings were used on the remaining 31.25%.

PASER

PASER is a visual system that uses surface distresses to assign a rating from 1 to 10, with 10 being the highest or best condition. PASER is widely used by many Indiana local agencies in Indiana as well as in other states. INDOT approves it as a viable pavement rating system and Indiana LTAP provides on-site and on-line training activities to help local agencies learn how to use it. The table below describes the PASER ratings:

Rating 9 & 10	No maintenance required
Rating 8	Little or no maintenance
Rating 7	Routine maintenance, cracksealing and minor patching
Rating 5 & 6	Preservative treatment (sealcoating)
Rating 3 & 4	Structural improvement and leveling (overlay or recycling)
Rating 1 & 2	Reconstruction

LTAP uses the following pavement condition rating breakdowns for Good, Fair and Poor ratings for PASER:

- Good: 8-10
- Fair: 5-7
- Poor: 1-4

Pavement Condition Index (PCI)

The PCI system was created by the Army Corps of Engineers but is now overseen by the American Society for Testing and Materials (ASTM). The PCI score is determined by a visual survey of the number and types of distresses in the pavement and uses a 0 - 100 scale with 0 being the worst condition and 100 being a newly constructed road. The ASTM divides PCI into 7 classes described in the following table:

Pavement Condition Index (PCI)	Pavement Condition
0-10	Failed
10 - 25	Very Poor
25 - 40	Poor
40 - 55	Fair
55 - 70	Good
70 - 85	Very Good
85 - 100	Excellent

LTAP uses the following pavement condition rating breakdowns for PCI:

- Good: 71-100
- Fair: 55-70
- Poor: 1-54

Comparisons of PASER and PCI Rating Systems

PCI and PASER ratings use different methodologies and cannot be directly compared with each other. PCI and PASER methods evaluate some of the same distresses but close examination of the two methods show that differences in the methodologies cause the same pavement segments to receive high PCI values and low PASER ratings. The differences in the two methods are mostly attributed to structural distresses including: alligator cracking and longitudinal cracking for asphalt and, and spalling and faulting for concrete (Montgomery 2018). This report will not group the PCI and PASER ratings together by their Good, Fair, and Poor breakdown. The 2 rating systems will be looked at separately.

Accuracy of the Data

This report summarizes the IMPO LPA's 2020 Asset Management Plans and INDOT recommends that LPAs perform a biennial pavement condition rating assessment. It should be noted that the data presented in this report could be as much as 2 years old and does not necessarily represent current pavement conditions.

3.3 PAVEMENT

3.3.1 Objectives and Measures

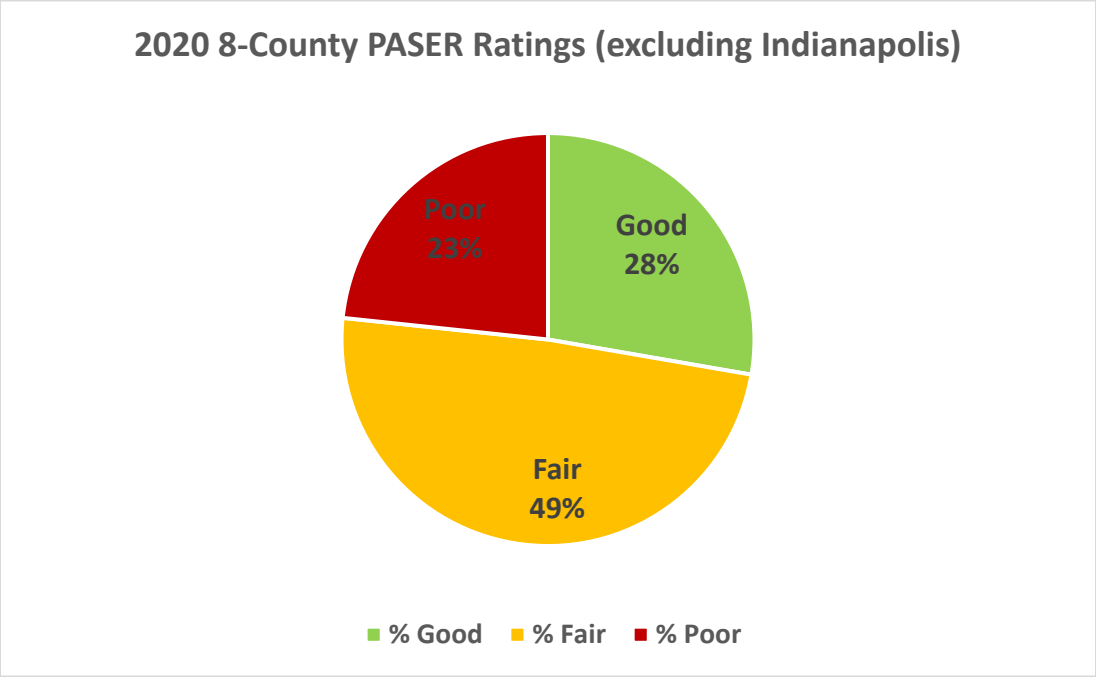
Objectives and Measures is a required component of the Pavement Asset Management Plan. Each community submitted their objectives and measures, which differed between communities based on local needs. These can be found in Appendix A. According to LTAP submission requirements, these Objectives and Measures must

- Define the Agency performance Goals and expected level of service for pavement
- Define the rating system used (PASER, PCI, etc.)
- Describe the process used to develop a work plan
- Describe the monitoring program and plan for making updates and adjustments
- Describe the drainage and ROW (Right of Way) conditions.

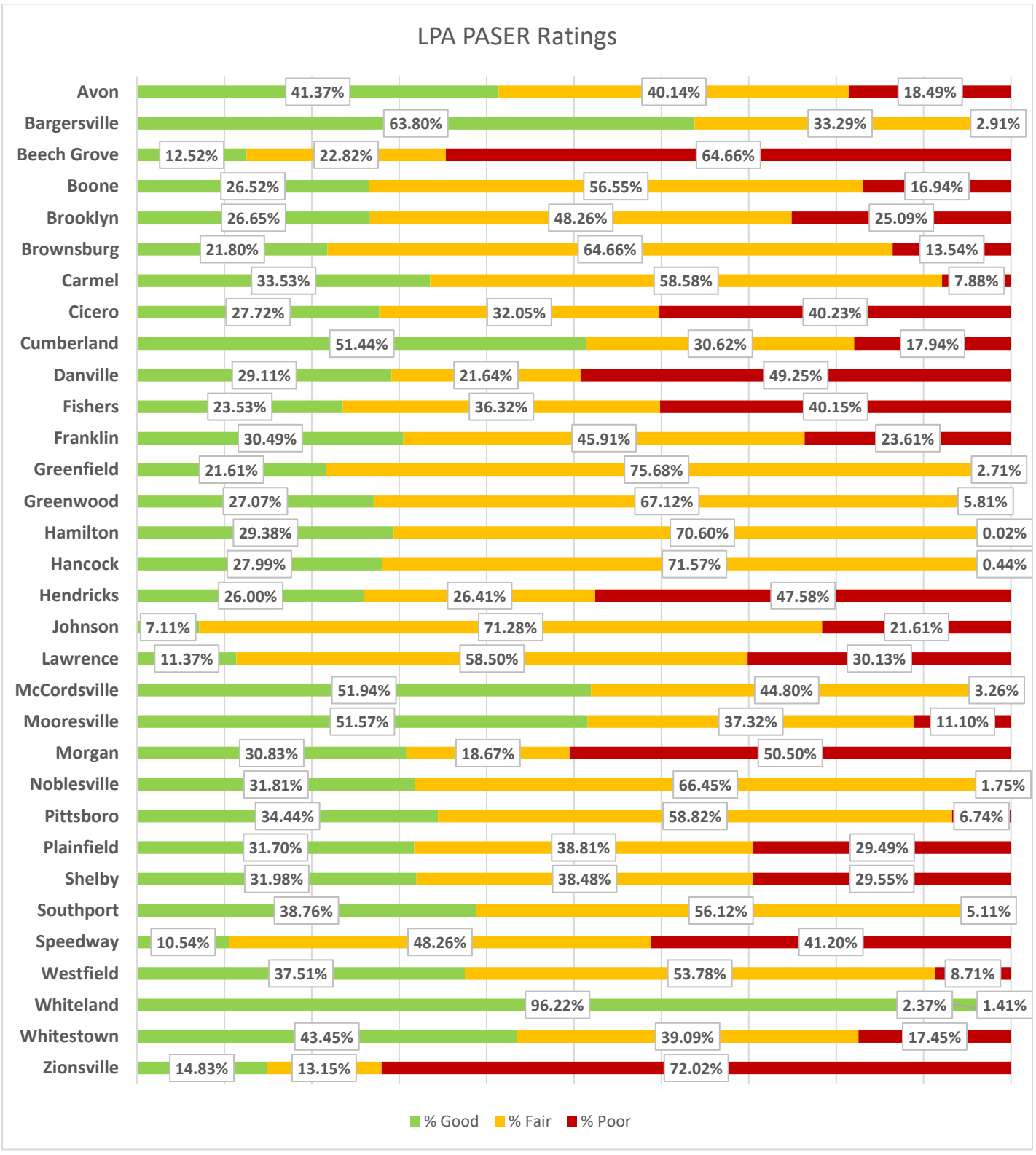
3.3.2 Pavement Condition

The percentage of Good, Fair, and Poor pavement for the 8-county area was calculated from the Pavement Condition Inventories (See Appendix B). The percent of Good, Fair, and Poor pavement was calculated from centerline miles. The Good, Fair, and Poor pavement conditions for the 33 individual local planning agencies that submitted Asset Management Plans to LTAP and for each of the 8 counties were also calculated. Because Indianapolis utilizes a different rating system (PCI) than the other LPAs (PASER), aggregate analysis was not able to be conducted and Indianapolis was analyzed on its own. Indianapolis cannot be directly compared with the other LPAs because of the differences in the 2 rating systems. The 2020 PASER ratings in this report should not be compared to the 2019 PASER ratings in last year's report. This is because last year's report included the mileage for roads with a gravel surface type and the pavement analysis for this report does not include the gravel roads.

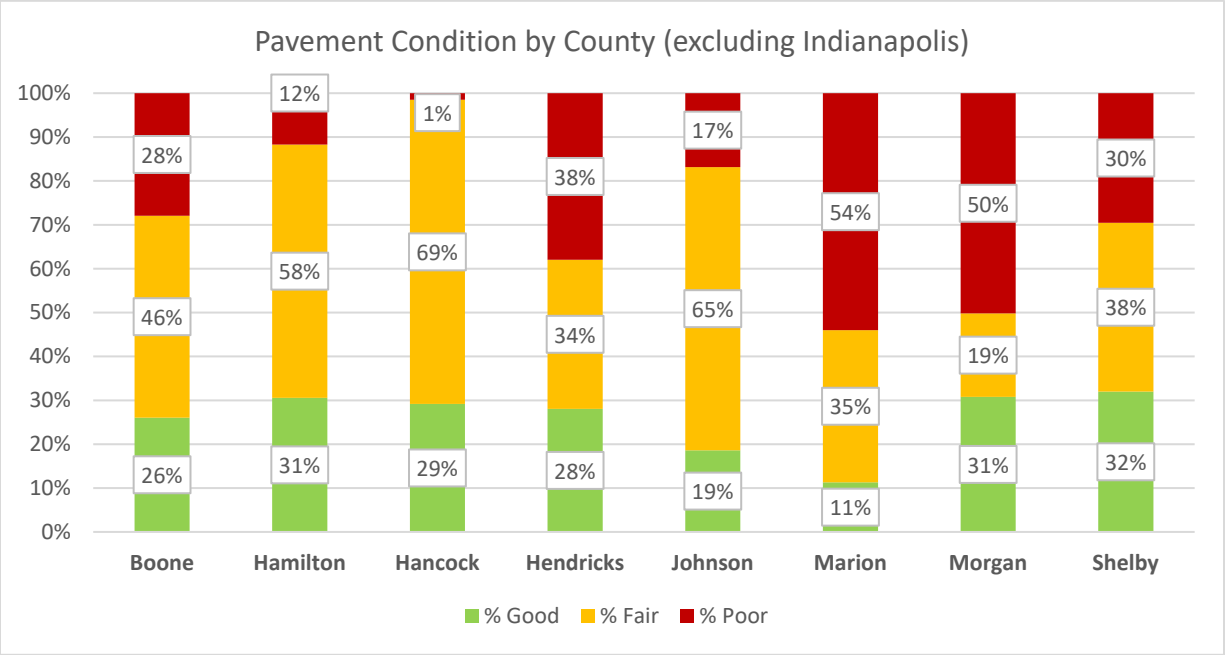
There are 11,319 centerline miles covered in the Pavement Condition Inventories in the IMPO's 8-county region. 7,920 miles are covered by the PASER rating system and the remaining 3,399 miles are covered the PCI rating system. Overall, for the 8-county region in 2020, 28% of PASER centerline miles were in Good condition, 49% were in Fair condition, and 23% were in Poor condition. For the PCI rating system, 22% were in Good condition, 24% in Fair condition, and 54% in Poor condition.


2020 8-County PASER Ratings (excluding Indianapolis)
Poor
23%
Good
28%
Fair
49%
% Good
% Fair
% Poor


2020 Indianapolis PCI Ratings
Good
22%
Poor
54%
Fair
24%
% Good
% Fair
% Poor


LPA PASER Ratings
Avon 41.37% 40.14% 18.49%
Bargersville 63.80% 33.29% 2.91%
Beech Grove 12.52% 22.82% 64.66%
Boone 26.52% 56.55% 16.94%
Brooklyn 26.65% 48.26% 25.09%
Brownsburg 21.80% 64.66% 13.54%
Carmel 33.53% 58.58% 7.88%
Cicero 27.72% 32.05% 40.23%
Cumberland 51.44% 30.62% 17.94%
Danville 29.11% 21.64% 49.25%
Fishers 23.53% 36.32% 40.15%
Franklin 30.49% 45.91% 23.61%
Greenfield 21.61% 75.68% 2.71%
Greenwood 27.07% 67.12% 5.81%
Hamilton 29.38% 70.60% 0.02%
Hancock 27.99% 71.57% 0.44%
Hendricks 26.00% 26.41% 47.58%
Johnson 7.11% 71.28% 21.61%
Lawrence 11.37% 58.50% 30.13%
McCordsville 51.94% 44.80% 3.26%
Mooresville 51.57% 37.32% 11.10%
Morgan 30.83% 18.67% 50.50%
Noblesville 31.81% 66.45% 1.75%
Pittsboro 34.44% 58.82% 6.74%
Plainfield 31.70% 38.81% 29.49%
Shelby 31.98% 38.48% 29.55%
Southport 38.76% 56.12% 5.11%
Speedway 10.54% 48.26% 41.20%
Westfield 37.51% 53.78% 8.71%
Whiteland 96.22% 2.37% 1.41%
Whitestown 43.45% 39.09% 17.45%
Zionsville 14.83% 13.15% 72.02%
% Good
% Fair
% Poor

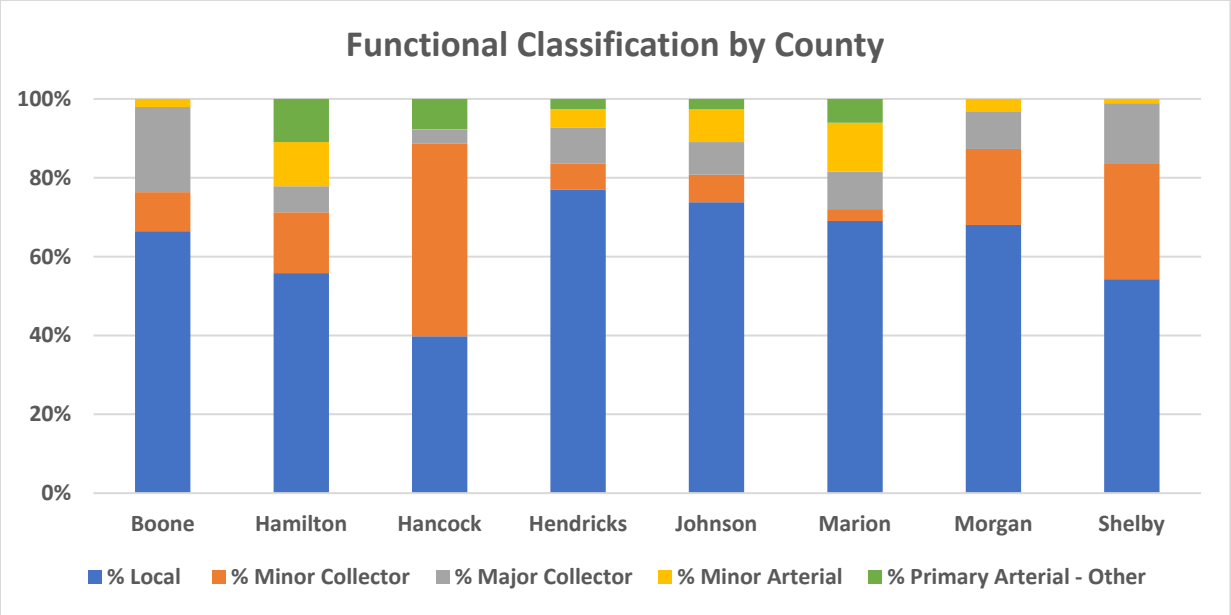
LPAs were grouped and analyzed by their respective county, along with the data submitted by the county LPAs.

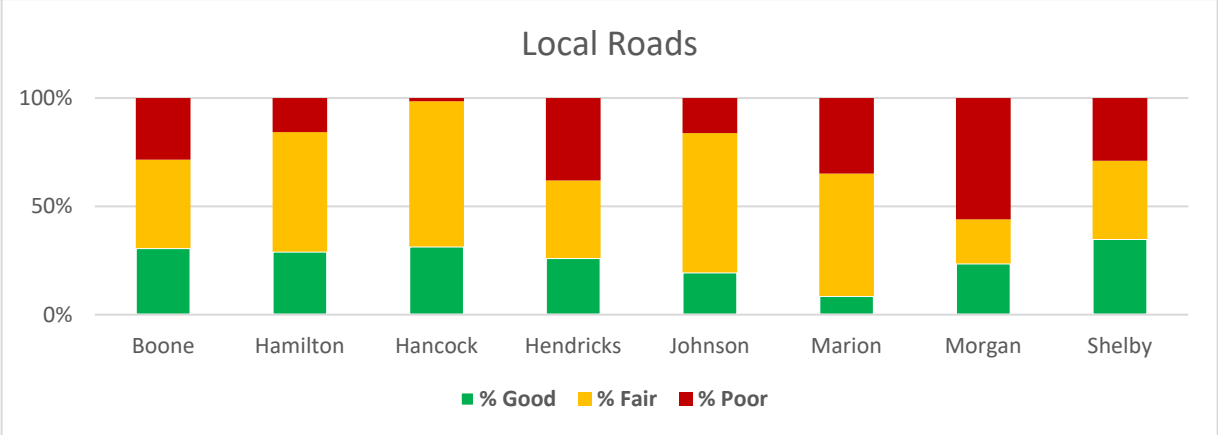


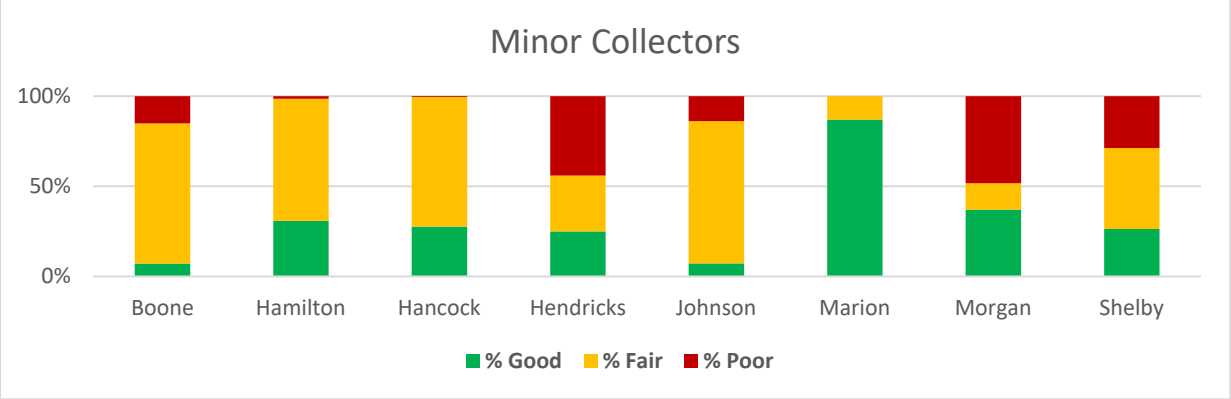
*Marion County only includes Beech Grove, Lawrence, Southport, Speedway

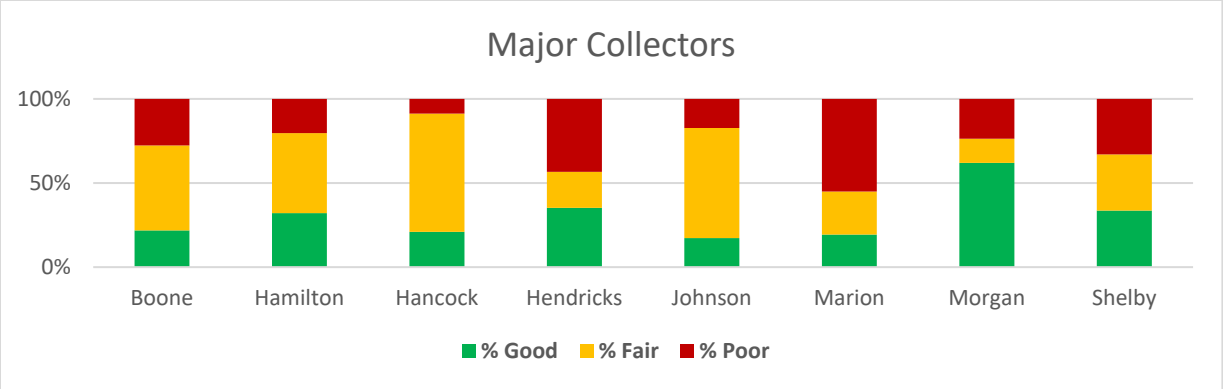
3.3.2.1 Pavement Condition by Functional Class

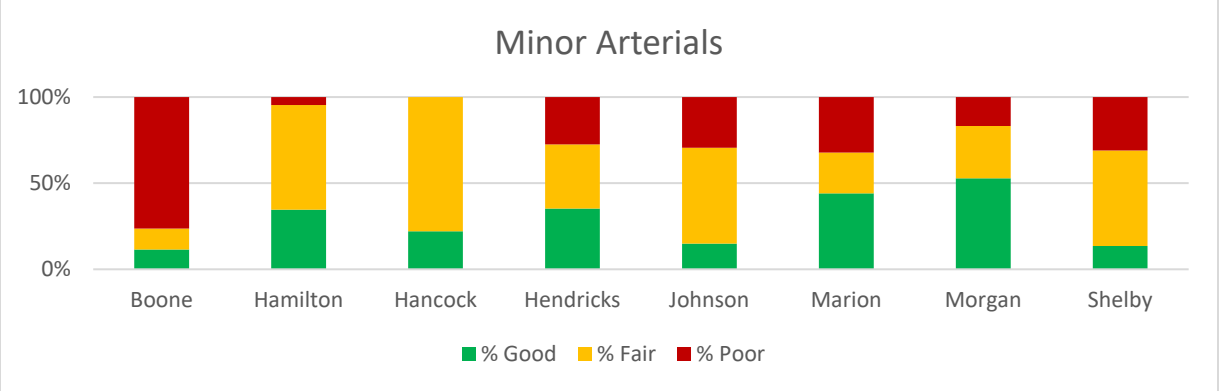
One of the required attributes for the Pavement Condition Inventories is the functional classification of each road segment. This allows examination of the pavement condition of each functional class. The functional classes with the highest percentage in Good condition were the Principal Arterials with 31.27% in Good condition and the lowest percent in Good condition were the Local Roads with 26.34% in Good condition. The functional class with the highest percent in Poor condition were the Major Collectors with 29.10% in Poor condition and the functional class with the lowest percentage in Poor condition were the Principal Arterials with 8.73% in Poor condition.

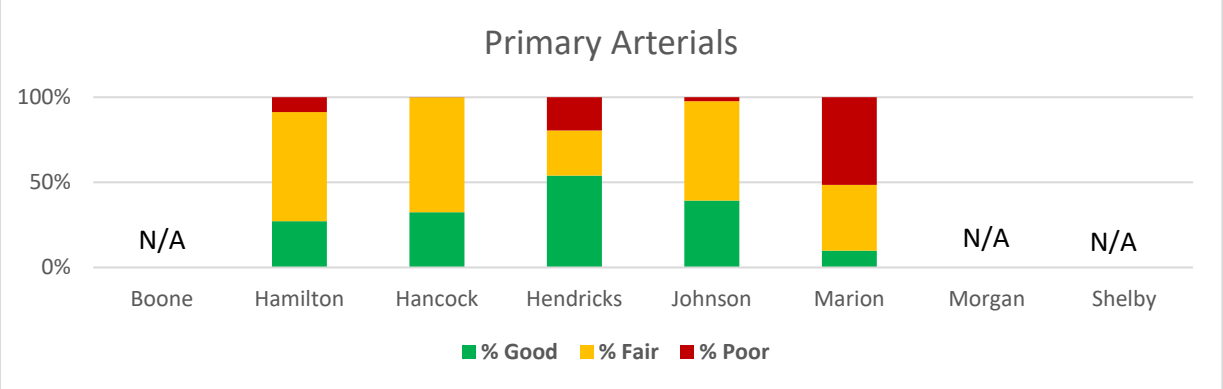

Functional Classification by County
100%
80%
60%
40%
20%
0%
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Local
% Minor Collector
% Major Collector
% Minor Arterial
% Primary Arterial - Other

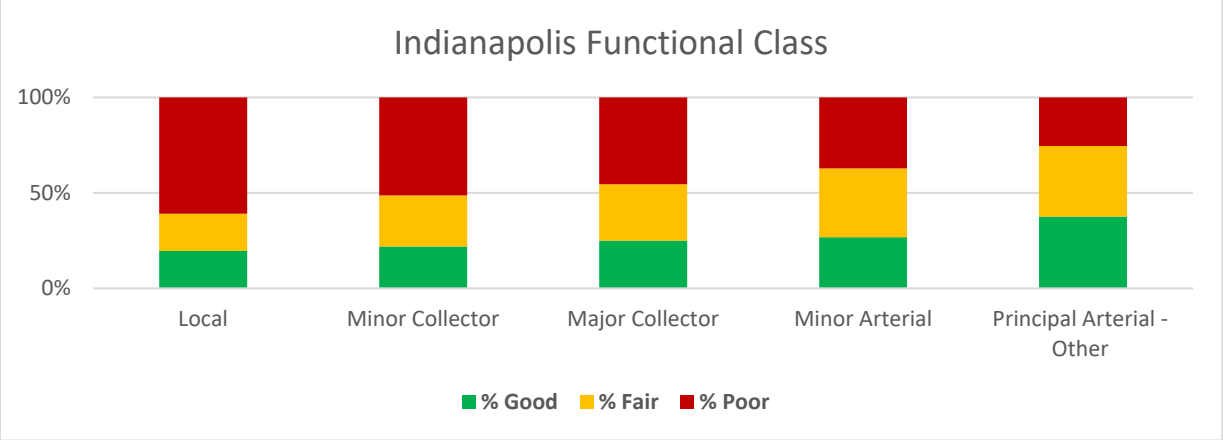

Local Roads
100%
50%
0%
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Good
% Fair
% Poor


Minor Collectors
100%
50%
0%
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Good
% Fair
% Poor


Major Collectors
100%
50%
0%
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Good
% Fair
% Poor

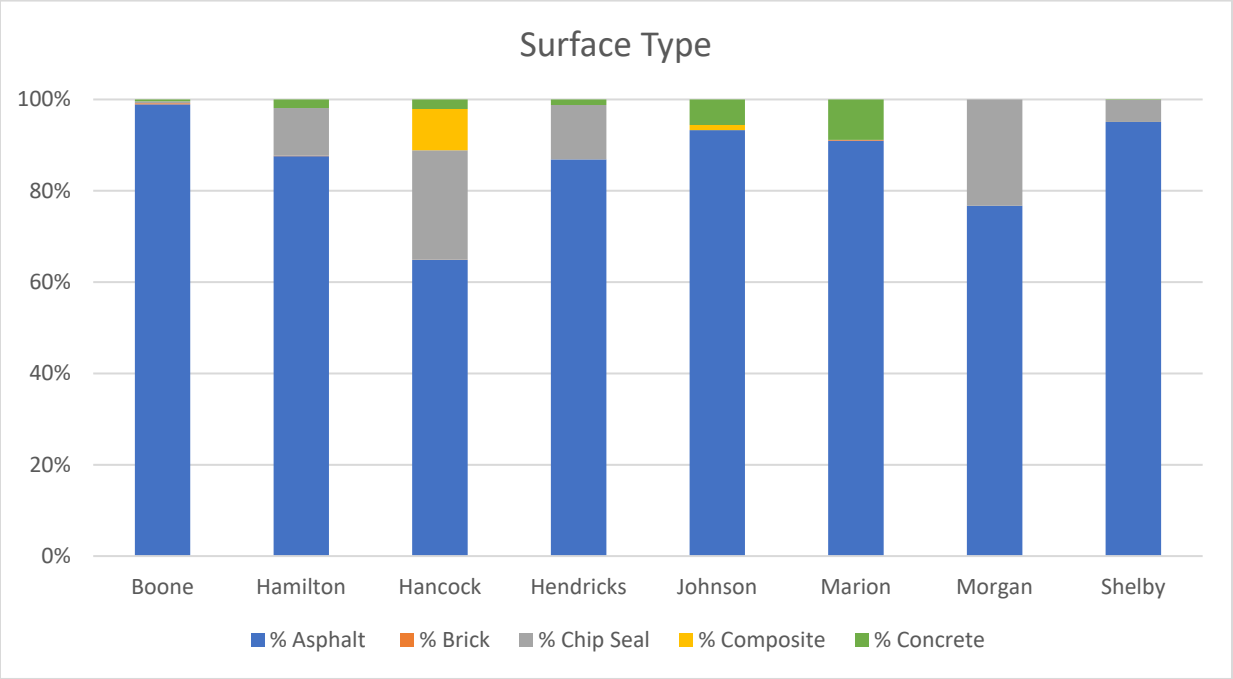

Minor Arterials
100%
50%
0%
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Good
% Fair
% Poor

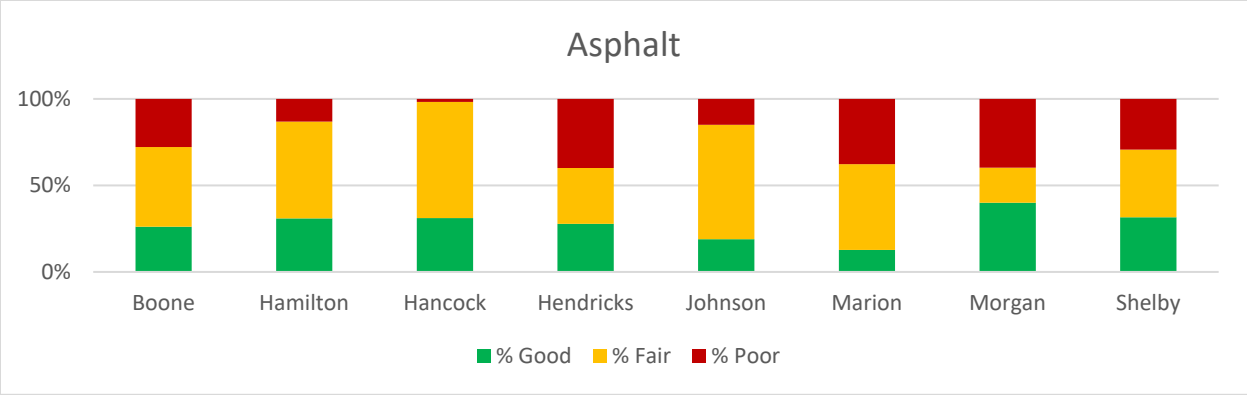

Primary Arterials
100%
50%
0%
N/A
N/A
N/A
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Good
% Fair
% Poor

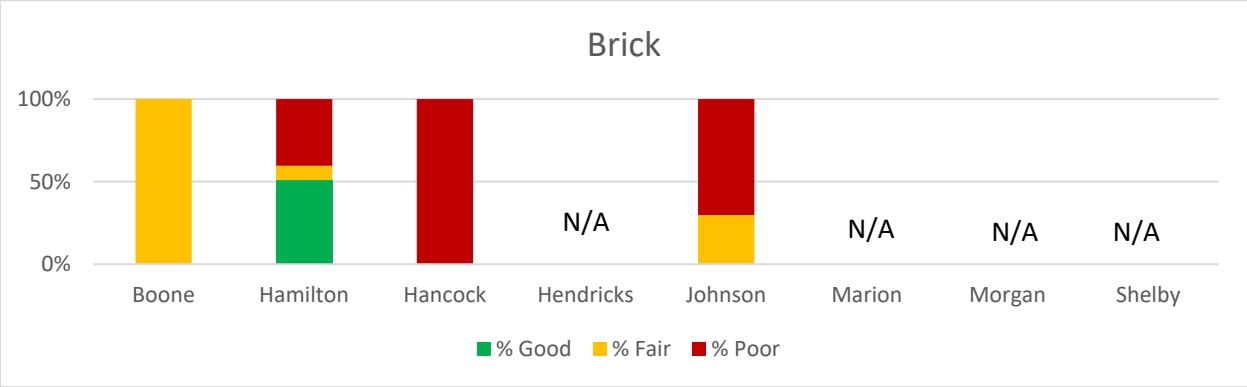

Indianapolis Functional Class
100%
50%
0%
Local
Minor Collector
Major Collector
Minor Arterial
Principal Arterial - Other
% Good
% Fair
% Poor

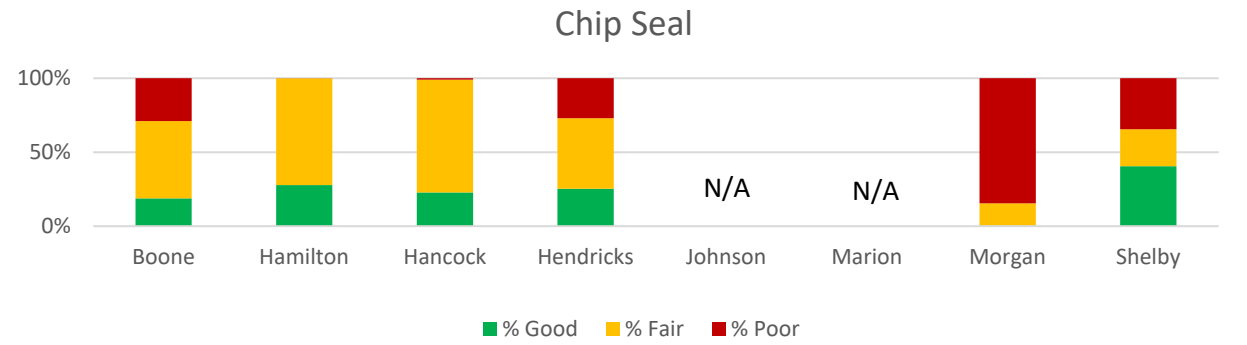
3.3.2.2 Pavement Condition by Surface Type

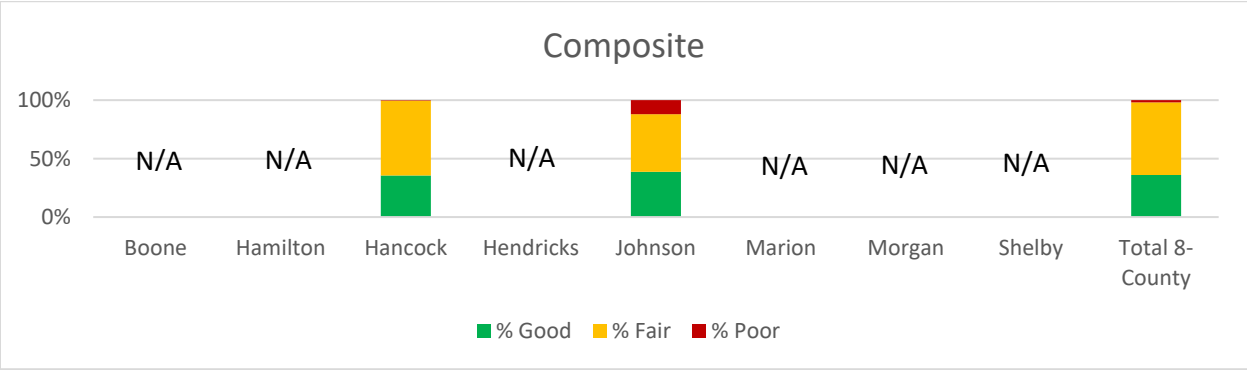
Another requirement of the Pavement Condition Inventories is the surface type of each segment. Pavement surface types include Asphalt, Brick, Chip Seal, Composite, and Concrete. 88% of the centerline miles on the pavement Inventories are paved with Asphalt. Only 0.10% of the 8-county region is paved with Brick. The surface type with the highest percent of centerline miles in good condition was Composite with 36% in Good Condition and the surface type with the lowest percent of centerline in Good condition was Chip Seal with 21% in Good Condition. Brick was the surface type with the highest percent in Poor condition with 31% and composite had the lowest percent in Poor condition with 1.88%.

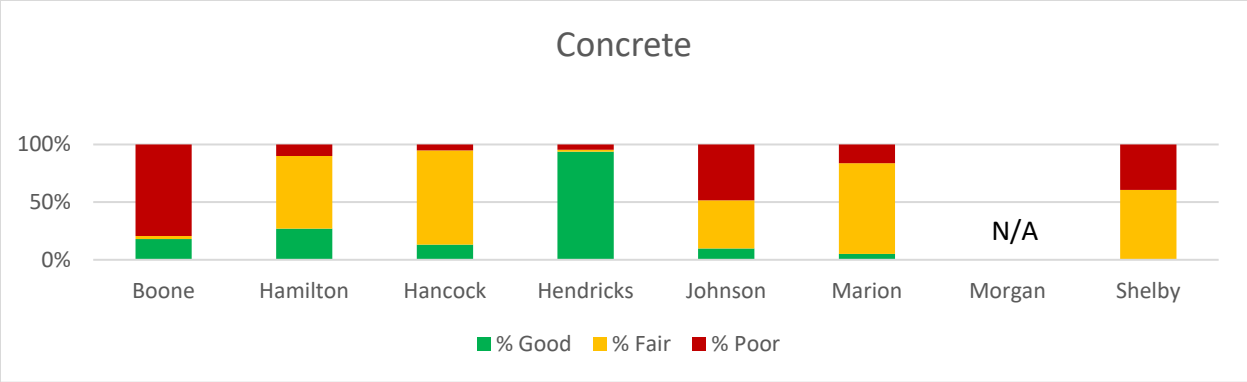


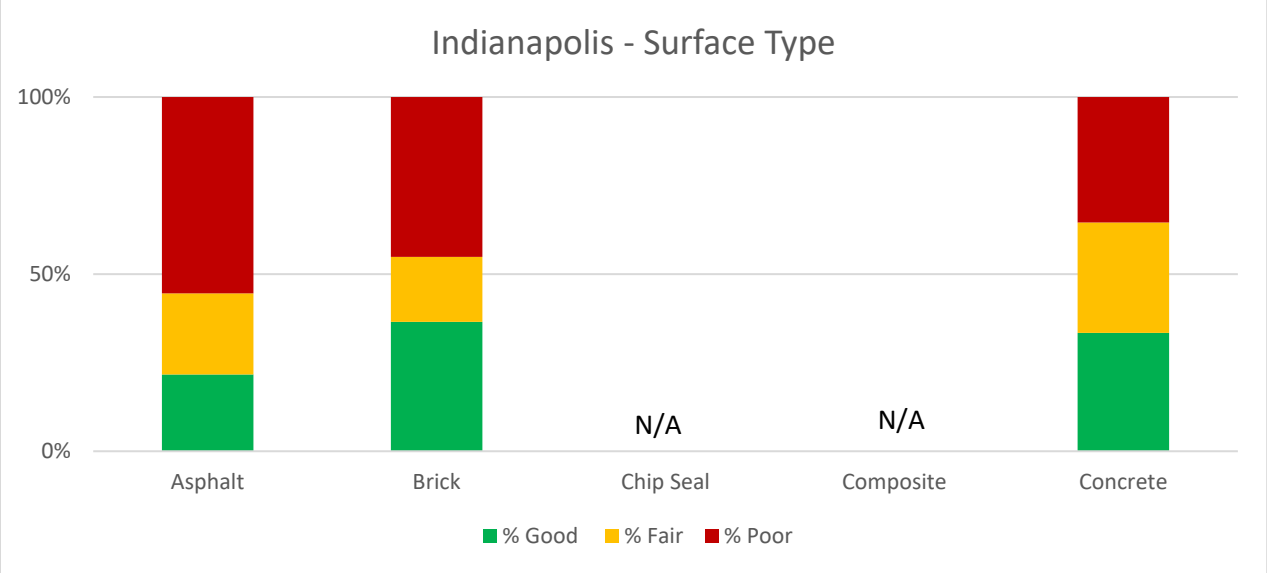

Asphalt
100%
50%
0%
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Good
% Fair
% Poor


Brick
100%
50%
0%
N/A
N/A
N/A
N/A
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Good
% Fair
% Poor


Chip Seal
100%
50%
0%
N/A
N/A
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Good
% Fair
% Poor

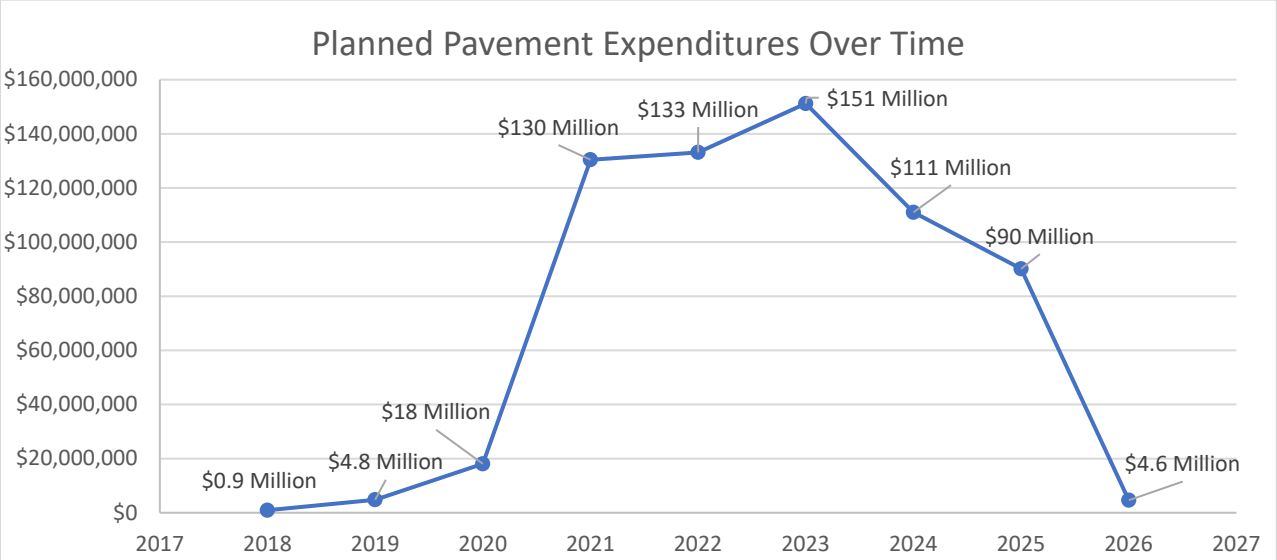

Composite
100%
50%
0%
N/A
N/A
N/A
N/A
N/A
N/A
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
Total 8-County
% Good
% Fair
% Poor


Concrete
100%
50%
0%
N/A
Boone
Hamilton
Hancock
Hendricks
Johnson
Marion
Morgan
Shelby
% Good
% Fair
% Poor

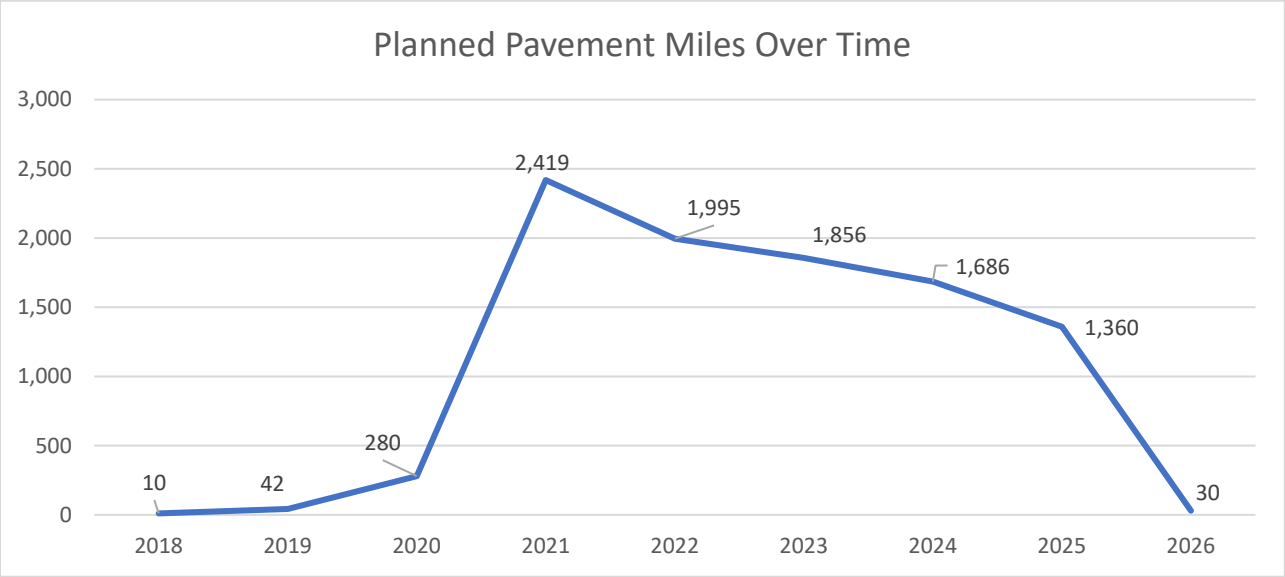

Indianapolis - Surface Type
100%
50%
0%
N/A
N/A
Asphalt
Brick
Chip Seal
Composite
Concrete
% Good
% Fair
% Poor

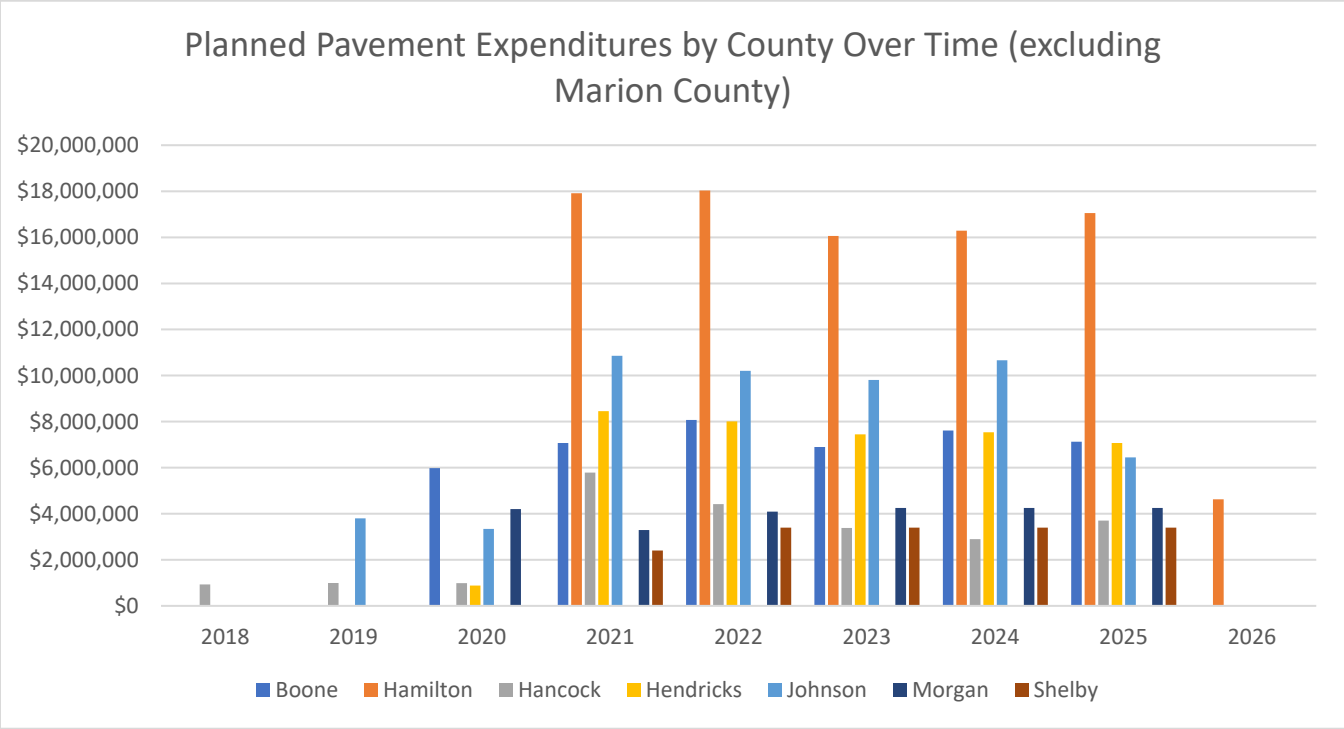
3.3.3 5-Year Treatment Plans for Pavement

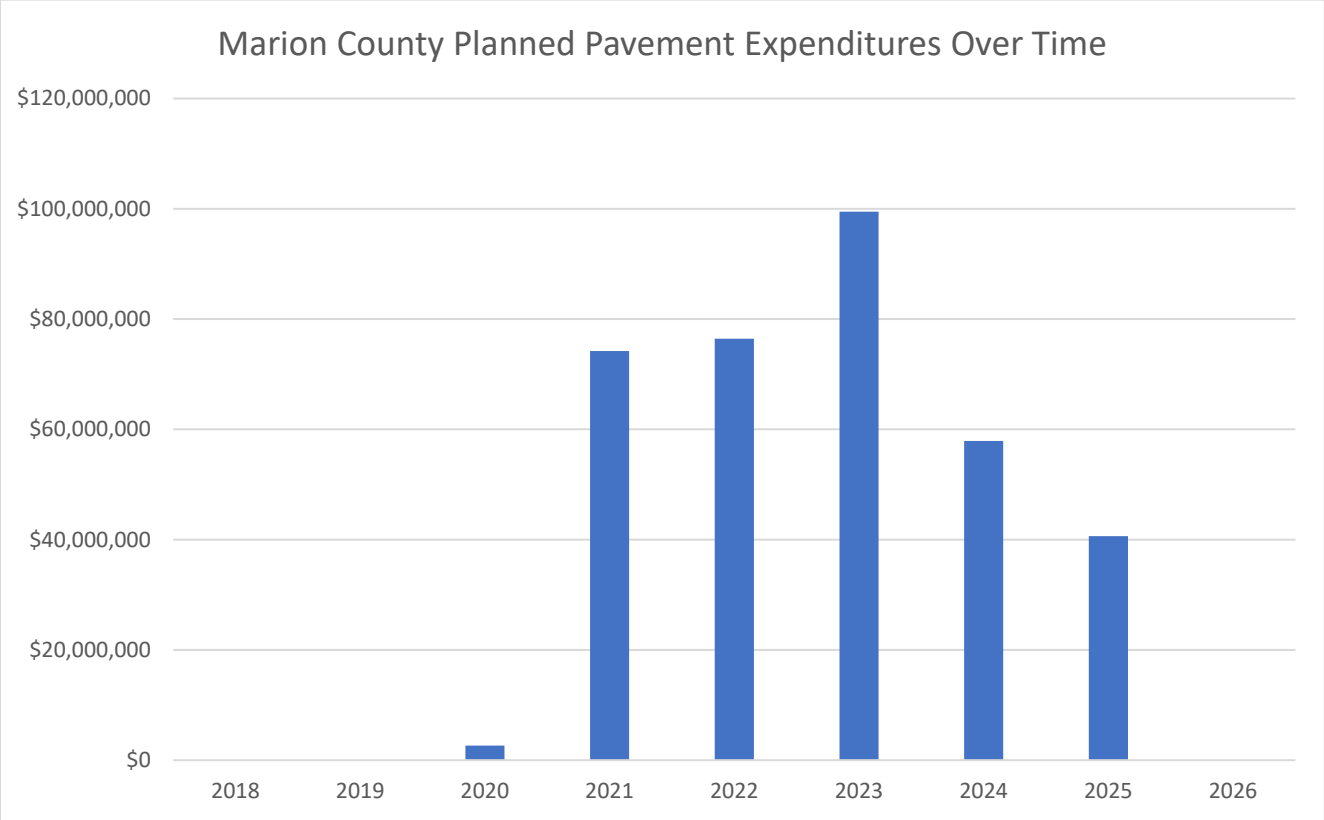
Another requirement for the Pavement Asset Management Plans is for each LPA to have a 5-Year Treatment Plan (See Appendix C). The 5-Year Treatment Plans lists all planned pavement treatment projects for the next five years and includes data regarding rating, treatment used, estimated cost per mile, estimated miles, and estimated cost. Most of the 2020 5-Year Treatment Plans contain the years 2021-2025 although a few start at 2018 and a few go through 2026. A total of $644,296,570 in expenditures is planned between 2018 and 2026 for the IMPO's LPAs. The highest expenditures are planned in 2021 with $151,181,974.



A total 9,678 miles of road have planned pavement work between 2018 and 2026. As represented by the graph below, LPAs are planning to invest in their infrastructure over time.



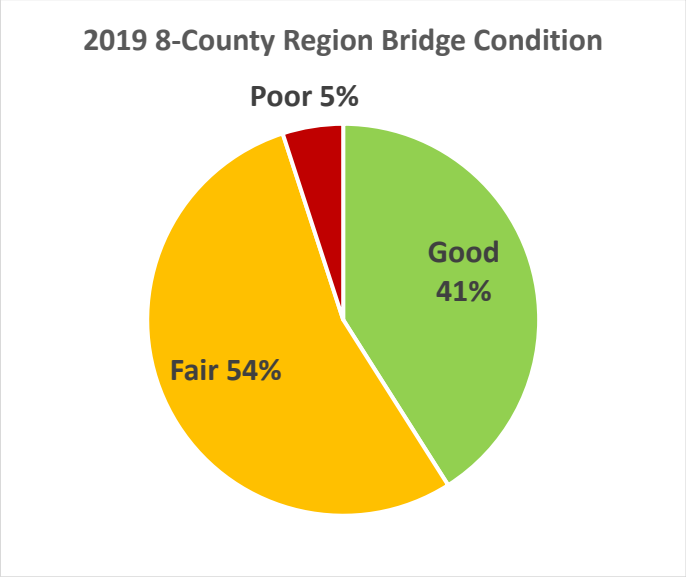

Planned Pavement Expenditures by County Over Time (excluding Marion County)
$20,000,000
$18,000,000
$16,000,000
$14,000,000
$12,000,000
$10,000,000
$8,000,000
$6,000,000
$4,000,000
$2,000,000
$0
2018
2019
2020
2021
2022
2023
2024
2025
2026
Boone
Hamilton
Hancock
Hendricks
Johnson
Morgan
Shelby

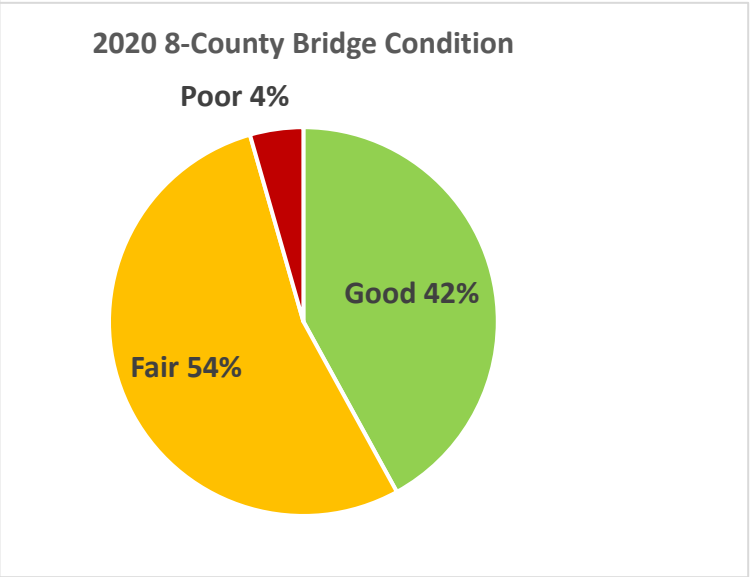

Marion County Planned Pavement Expenditures Over Time
$120,000,000
$100,000,000
$80,000,000
$60,000,000
$40,000,000
$20,000,000
$0
2018
2019
2020
2021
2022
2023
2024
2025
2026

The pavement treatment with the largest number of planned miles to be repaired is Crack Seal with 2,655 miles of work planned which is followed by Reconstruction - Asphalt with 1,574 miles of work planned.

3.4 Bridge Asset Management

According to the Federal Highway Administration (FHWA), Bridge Asset Management focuses on making informed and effective decisions on the operation, maintenance, preservation, replacement, and improvement of bridges within a bridge inventory (U.S. Department of Transportation Federal Highway Administration, 2020). For the Community Crossings Matching Grant, LPAs must only submit a Bridge Priority List to LTAP. The rest of the bridge condition information can be found in the National Bridge Inventory (NBI) which is maintained by FHWA. In total, there are 1,950 bridges and culverts in the 8-county region that are locally maintained. All bridges are maintained by the county.





3.4.1 National Bridge Inventory

The National Bridge Inventory (NBI) is a database compiled by the FHWA which contains information for all bridges and tunnels in the United States. The NBI was developed to have a unified database for bridges to ensure the safety of the traveling public as required by the Federal-Aid Highway Act of 1968. The NBI contains bridge inspection information which can be used to determine a condition rating for each bridge (U.S. Department of Transportation Federal Highway Administration, 2020).

3.4.1.1 NBI Condition Ratings

The bridge condition is determined by the lowest rating of the deck, superstructure, substructure, or culvert. If the lowest rating is greater to or equal to 7 then the bridge is

classified as Good, if it is less than or equal to 4 then it is classified as Poor, and if it is below 7 but above 4 then it is classified as Fair.

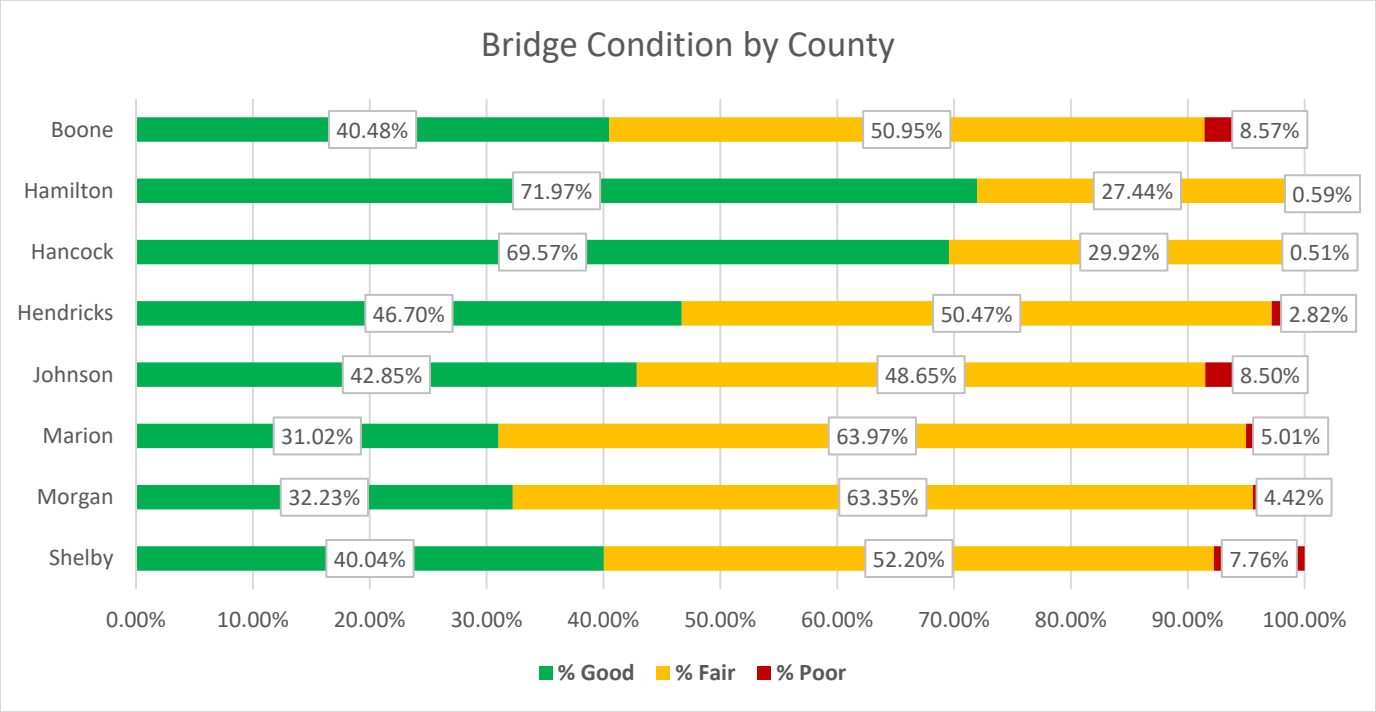
3.4.1.2 8-County Region NBI Analysis

According to the NBI, there are 1,950 locally maintained bridges and culverts in our 8-county region. The county with the most bridges was Marion County with 532 bridges and the county with the least bridges was Morgan County with 144 bridges. The bridge condition analysis was performed by looking at the percent of the bridge area in each condition rating category.

Analyzing the 2020 NBI data for the entire 8-county region, 42% of all bridges were in Good condition, 54% were in Fair condition, and 4% were in Poor condition. The NBI also contains information about the age of the bridges. The average age of the 1,950 bridges is 42 years old.

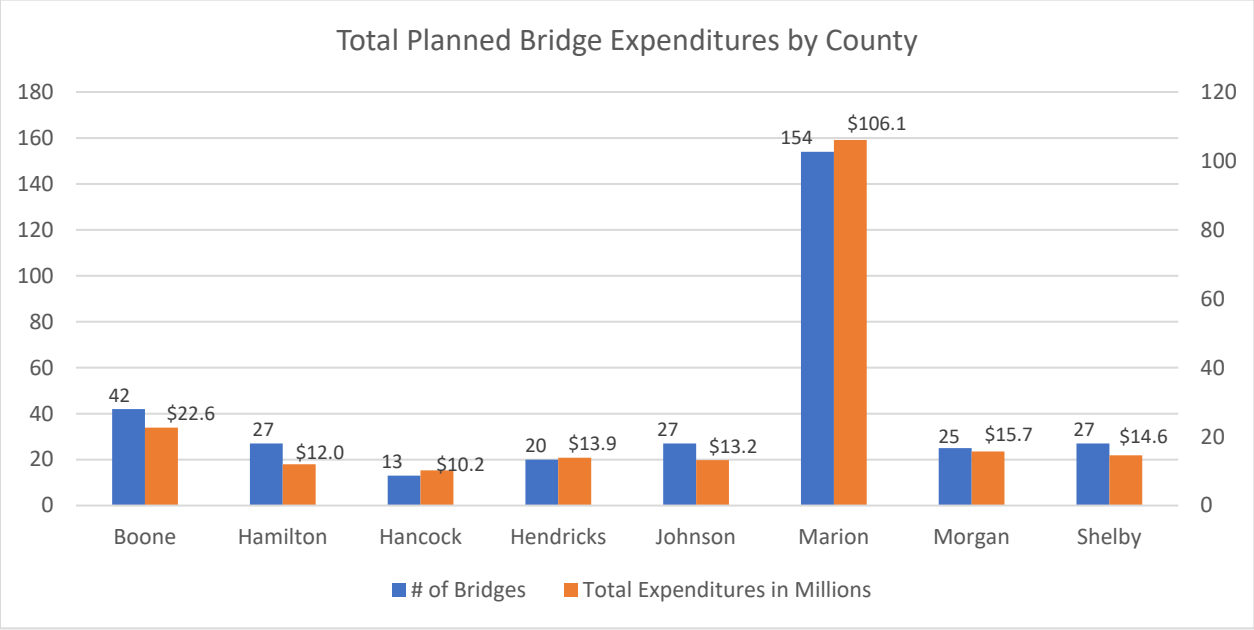
Condition of Locally Maintained [illegible] Culverts in 8-County Region

County	Total # of Bridges + Culverts	Average Age of Bridges and Culverts	Good Condition (Sq. Miles)	% Good	Fair Condition (Sq. Miles)	% Fair	Poor Condition (Sq. Miles)	% Poor	Total Area (Sq. Miles)
Boone	190	52	13,467	40.48%	16,951	50.95%	2,853	8.57%	33,270
Hamilton	327	26	79,264	71.97%	30,225	27.44%	651	0.59%	110,141
Hancock	158	33	22,780	69.57%	9,796	29.92%	168	0.51%	32,744
Hendricks	245	41	26,929	46.70%	29,104	50.47%	1,628	2.82%	57,662
Johnson	164	38	15,430	42.85%	17,520	48.65%	3,062	8.50%	36,012
Marion	532	52	115,482	31.02%	238,173	63.97%	18,638	5.01%	372,292
Morgan	144	40	8,859	32.23%	17,410	63.35%	1,215	4.42%	27,484
Shelby	190	46	17,996	40.04%	23,464	52.20%	3,490	7.76%	44,950
Grand Total	1950	42	300,207	42.01%	382,643	53.55%	31,705	4.44%	714,554

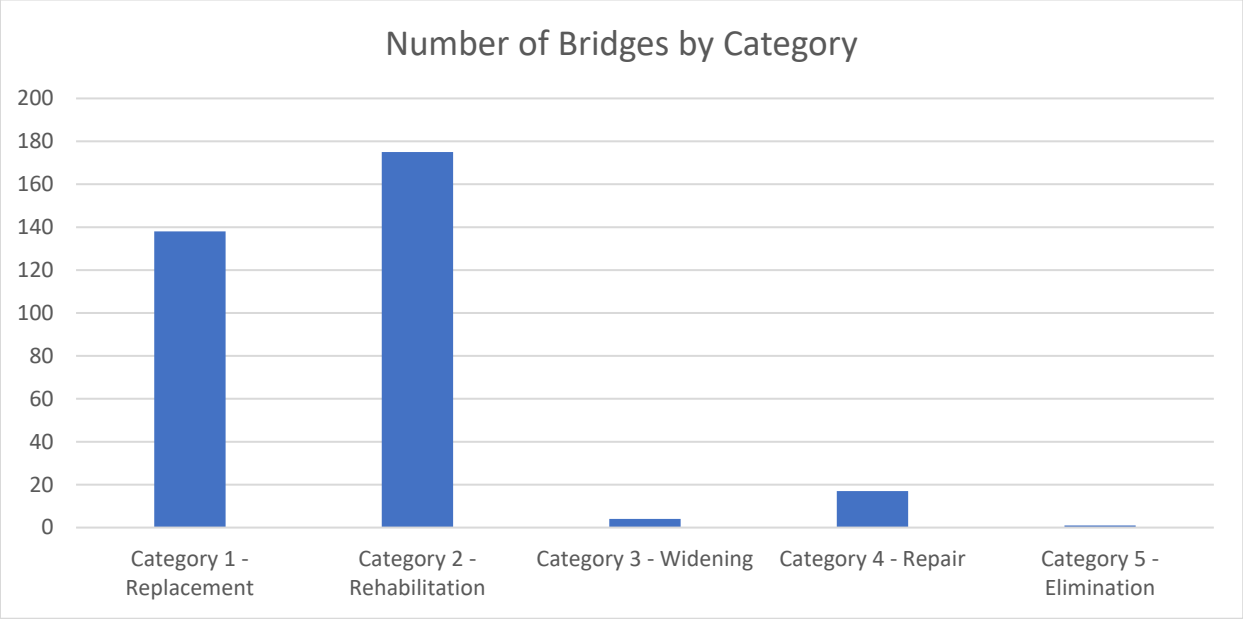


3.4.2 Bridge Priority List

Each county in Indiana is required to submit a Bridge Priority List to LTAP (See Appendix D). The purpose of the Bridge Priority list is to prioritize each county's bridge work for the next ten years and to categorize them into five types of work: replacement, rehabilitation, widening, repair, and elimination. In total, there are 335 bridges included in the Bridge Priority List, totaling to approximately $208,300,000 in expenditures in Central Indiana.



There are 175 bridges that are planned for rehabilitation work in the next 5 years. This is closely followed by 138 bridges planned for replacement. There is only 1 bridge planned for elimination.



Year of Planned Work	Boone	Hamilton	Hancock	Hendricks	Marion	Johnson	Morgan	Shelby	Total
2018	0	0	0	0	0	0	0	1	1
2019	0	0	0	0	21	0	0	2	23
2020	5	6	4	1	20	3	4	3	46
2021	5	11	3	3	20	3	4	3	52
2022	4	2	3	4	20	3	4	2	42
2023	5	5	2	2	20	3	4	4	45
2024	4	2	1	3	20	3	3	4	40
2025	5	1	0	4	20	3	2	4	39
2026	4	0	0	3	10	3	2	4	26
2027	5	0	0	0	3	3	2	0	13
2028	4	0	0	0	0	3	0	0	7
2029	1	0	0	0	0	0	0	0	1
Grand Total	42	27	13	20	154	27	25	27	335

3.5 Conclusion

Pavement and bridge asset management plans contain useful information about the state and condition of Central Indiana's transportation assets. These plans can be used as a tool to inform which roads and bridges need the most funding to improve the region's transportation and safety. The IMPO will continue to monitor the pavement and bridge ratings for Central Indiana in the future.

4 REFERENCES

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